

UGANDA PROTECTORATE.

ANNUAL REPORT

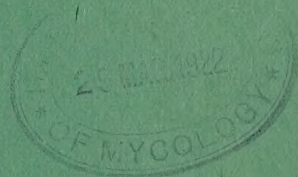
OF THE

DEPARTMENT OF AGRICULTURE

FOR THE

NINE MONTHS ENDED 31ST DECEMBER, 1920.

Published by Command of His Excellency the Governor.



ENTEBBE :

PRINTED BY THE GOVERNMENT PRINTER, UGANDA,
1921.

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THE AGRICULTURAL

ANNUAL REPORT

1880

DEPARTMENT OF AGRICULTURE

1880

STATE OF NEW YORK

REPORT OF THE

COMMISSIONER OF AGRICULTURE

AND OF THE AGRICULTURAL EXPERIMENT STATION

UGANDA PROTECTORATE.

DEPARTMENT OF AGRICULTURE.

				<i>P.O. Box</i>	<i>Telephone</i>
				<i>No.</i>	<i>No.</i>
HEAD OFFICE	...	...	Kampala	53	15
MYCOLOGICAL OFFICE AND LABORATORY	...	...	Kampala	5	26
ENTOMOLOGICAL OFFICE AND LABORATORY	...	...	Kampala	5	25
BOTANICAL GARDENS AND METEOROLOGICAL OFFICE	...	...	Entebbe	60	38

EXPERIMENTAL PLANTATIONS :—

- | | |
|------------------------|------------------------|
| (1) Kampala. | (4) Fort Portal, Toro. |
| (2) Kakumiro, Mubendi. | (5) Kumi, Teso. |
| (3) Simsa, Soroti. | (6) Serere, Teso. |
| (7) Bukalasa, Mengo. | |

ANNUAL REPORT, 1920.

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STAFF LIST.

<i>Director of Agriculture</i>			S. SIMPSON, B.SC., (EDIN.), M.R.A.S.E., N.D.A.
<i>Deputy Director of Agriculture</i>			L. HEWETT, M.R.A.C.
<i>Office Superintendent</i>	....	....	A. S. WIDGERY.
<i>Clerk</i>	....	....	H. G. SMITH.

GENERAL DIVISION :

Senior District Agricultural Officers :

R. G. HARPER. A. R. MORGAN.

District Agricultural Officers :

J. D. SNOWDEN. R. T. WICKHAM. (VACANT)

Assistant District Agricultural Officers :

C. HAZEL. P. CHANDLER. CAPT. J. S. HARMSWORTH, M.C.
G. T. PHILPOTT. F. W. HALL. E. A. RUCK.

<i>Ploughing Instructor</i>					A. FISHBURN.
-----------------------------	------	------	------	------	--------------

BIOLOGICAL DIVISION :

<i>Mycologist</i>	....	....	....	....	W. SMALL, M.B.E., M.A., B.SC., F.L.S.
<i>Entomologist</i>	....	....	....	....	H. HARGREAVES, A.R.C.S., D.I.C., F.E.S.

BOTANICAL DIVISION :

<i>Curator, Botanic Gardens, Entebbe</i>					(VACANT.)
--	------	------	------	------	-----------

CLERICAL STAFF :

Clerks :

W. NORONHA. J. C. DE SOUZA. P. S. J. SILVA.

ANNUAL REPORT
OF
THE DEPARTMENT OF AGRICULTURE,
UGANDA PROTECTORATE,

For the Nine Months Ended 31st December, 1920.

Staff.

Mr. L. Hewett, Deputy Director of Agriculture, went on leave on April 13th and was away at the end of the year.

Mr. R. G. Harper, Senior District Agricultural Officer, went on leave on 5th November.

Mr. J. D. Snowden, District Agricultural Officer, returned from leave on 24th April.

Mr. R. T. Wickham arrived on the 24th July on appointment as District Agricultural Officer.

Messrs. G. T. Philpott and F. W. Hall arrived on June 25th and Mr. E. A. Ruck on 15th December, on appointment as Assistant District Agricultural Officers.

Mr. C. C. Gowdey, Government Entomologist, was transferred to Jamaica, and the vacancy was filled by Mr. H. Hargreaves, who arrived on 17th November.

Mr. W. Small, Mycologist, went on leave on 10th May, and was away at the end of the year.

Mr. A. S. Widgery, Office Superintendent, was absent on leave throughout the whole period.

Although it has at last been possible to fill some of the vacancies on the staff list, it is to be regretted that the inducements offered make it impossible to obtain either adequately trained or experienced men. Other countries whose prosperity depends far less on agricultural development give greater advantages to trained men, with the result that few candidates are available for service in Uganda. To deal adequately also with agricultural development the staff needs to be largely augmented. For example, at present practically nothing can be done in the Northern and Western Provinces, as the staff is fully occupied in the Eastern and Buganda Provinces on crops which are already established, and which require unremitting care and attention. Even in the Buganda Province a district like Masaka suffers from neglect, as it is possible only to pay occasional visits. Extra staff is needed particularly in the case of developing new products such as sugar and tobacco, whilst the very promising wheat, rice and coffee industries which have been built up, make slow progress owing entirely to insufficient supervision and encouragement. The live stock industry is entirely neglected, and the stock farm is continually cut out of the estimates. Some districts offer great scope for the development of live stock, particularly Teso and Ankole, and would well repay serious attention.

General.

This report is for nine months only and therefore its general interest is not so great as usual. Prices of all agricultural products ruled extremely high at the beginning of the period, but the decline suddenly set in, and by the end of the year most products were quoted at low prices on the home market. Development work was suddenly stopped on all estates, and the owners of many of the larger ones were seriously considering the advisability of closing down temporarily until the depression passed over.

Weather conditions were favourable throughout the year. The labour position improved, and the wages on estates were generally reduced to meet the changed conditions.

Exports.

The total value of the exports for the nine months was £4,134,136 compared with £1,828,537 for the previous twelve months, shewing an increase of £2,305,599 due entirely to the abnormally high price of cotton.

In Appendix No. 14 is given a comparative statement of exports during the last two years, whilst in Appendix No. 15 the figures are given for five years.

In Appendices Nos. 16 and 17 are given the export figures from all ports and railway stations in the Protectorate, and it must be noted that inter-port and station traffic within the Protectorate is not recorded in the table.

The principal products of the export table are represented by the following, and the percentage of each compared with the total exports is given:—

			£		
Cotton Ginned	...	170,338 cwts.	...	3,778,931	= 91·408%
Coffee	...	25,691 "	...	90,362	= 2·185%
Hides	...	10,130 "	...	67,554	= 1·634%
Ivory	...	95,332 lbs.	...	61,452	= 1·486%
Simsim	...	28,511 cwts.	...	50,133	= 1·216%
Skins, Goat	...	1,647 "	...	24,912	= ·602%
Rubber	...	314,549 lbs.	...	23,767	= ·574%
Cotton Seed	...	37,477 cwts.	...	8,990	= ·217%
Other Exports	...	...	...	28,035	= ·678%
TOTAL EXPORTS		...	...	£4,134,136	

Cotton.

Full details of this crop were given in the last annual report, and progress is reported from all parts of the Protectorate.

The growth of the crop is confined almost entirely to natives, who cultivate innumerable small plots of cotton which in the aggregate amount to a considerable acreage. In 1920 the exports of cotton amounted to 52,186 bales of 400 lbs. each, or a total of 20,874,400 lbs. of lint. If the lint is calculated at 30% of the seed cotton, the production of seed cotton is practically seventy million pounds in weight. All this cotton has to be carried to ginneries and markets by the growers themselves without any other means of transport than head portorage. An average load is 56 lbs. exclusive of the weight of the bag, so that at least one and a quarter million of loads of cotton have to be carried, weighed and paid for in cash during the season.

The production during 1921 is estimated to exceed 65,000 bales.

Cotton Seed Distribution.

Cotton seed distribution figures throughout the country are as follows:—

Eastern Province:—				Northern Province:—			
		Bags of 56 lbs. each.				Bags of 56 lbs. each.	
		1919	1920			1919	1920
Teso District	...	4,590	12,600	Gulu District.	...	225	330
Bukedi "	...	3,500	10,000	Bunyoro "	...	270	540
Busoga "	...	5,000	7,229	Kitgum "	...	25	200
Lango "	...	2,358	5,400	West Nile "	...	—	50
TOTAL		15,448	35,229	TOTAL	...	520	1,120
Buganda Province:—				Western Province:—			
Mengo District	...	4,385	6,680	Toro District	...	60	131
Entebbe "	...	721	2,090	Ankole "	...	350	500
Masaka "	...	1,000	1,250				
Mubendi "	...	546	1,154			410	631
TOTAL	...	6,652	11,174	GRAND TOTAL (Bags)		23,030	48,154

In addition to the above, European Planters took approximately 320 bags.

The total seed distribution in 1920 equalled 1,212 tons.

Acreages.

The estimated acreage planted in the various districts is shown in the following table:—

Eastern Province:—

	1919	1920
Teso District	40,000	53,000
Bukedi „	32,000	42,000
Busoga „	23,000	30,000
Lango „	16,050	23,000
TOTAL	111,050	148,000

Northern Province:—

	1919	1920
Gulu District	1,000	1,500
Bunyoro „	1,350	2,000
Kitgum „	100	500
West Nile „	—	100
TOTAL	2,450	4,100

Buganda Province:—

Mengo District	27,000	30,000
Entebbe „	4,300	10,000
Masaka „	6,000	7,000
Mubendi „	3,250	6,000
TOTAL	40,550	53,000

Western Province:—

Toro District }	1,500	2,000
Ankole „ }		
GRAND TOTAL	155,550	207,100

The total acreage under cotton is therefore 207,100.

The Sale of the Crop.

Owing to the financial depression it is not expected that the crop will be sold without difficulty. It is fully realised also that the prices paid will be low. The change in the currency from rupees to florins adversely affects local prices, because with the florin at two shillings this means that Rs 7/50 per 100 lbs. seed cotton paid formerly is now represented by Fls. 5/- and so on in proportion.

In areas where private enterprise is unable to buy the crop, some scheme of Government buying on its own account will be brought into operation, but it is hoped that the quantity to be bought on Government account will not be large.

Cotton Ginneries.

Cotton ginneries are still being built in various parts of the country, but some areas such as the Northern Province have not a single working ginnery, although ginnery plots have been taken up.

Mubendi District needs a ginnery, whilst cotton cultivation would increase in Mengo District if a ginnery were built in Buruli and one in Southern Kiagwe.

Cotton Seed Selection Stations.

The money ear-marked from the cotton tax to start cotton seed selection work on a permanent basis was available during the year, and this work was started both at Serere and Bukalasa. Temporary buildings were erected at both places to carry on, and the permanent buildings at Serere are now being erected. It is hoped that the buildings for Bukalasa will be started at an early date.

Marking of Cotton for Export.

Some cotton ginners fail to realise the importance of marking the cotton exported strictly according to its quality, and cases of marking third grade cotton as first quality have cropped up. This procedure has a very bad influence on the market and the whole industry suffers accordingly, as buyers cannot be deceived more than once. Complaints of the presence of extraneous fibres in bales of Uganda cotton are much too frequent and must be avoided. Such fibres damage the machinery and cause dissatisfaction to the cotton operatives so that spinners in many cases refuse to buy Uganda cotton. A Ginning Inspector is urgently needed, as good cotton is often ruined after it has been delivered to the ginneries by the producers.

The Cotton Duty.

In 1919 this duty realised £47,227 which was paid into the Uganda Cotton Development Fund, out of which this Department was given £10,500, and the balance to the Public Works Department for roads, etc. In 1920 the duty realised £56,929 which went to general revenue.

The estimated amount to be realised in 1921 is £67,000, also for general revenue. After 1922 this duty is to be reconsidered, and if continued it is hoped that the whole of it will be ear-marked for the Agricultural Department for development purposes.

Coffee.

The Coffee Expert who was appointed during the year had not arrived, which is to be regretted, as coffee is the principal crop on European Plantations.

There is every reason to expect that coffee production will increase under normal conditions, but towards the end of the year prices were so low that producers were able to realise very little profit.

Grassiness in Coffee.

Many complaints of "grassiness" in Uganda coffee were received from brokers during the year, and efforts are being made to trace the origin of the trouble. A good water supply is essential on coffee estates, but on many estates here the water supply is totally inadequate. During the coffee curing season rain often retards the drying of the parchment, and this may be one of the reasons why "grassiness" has become more prevalent than in past seasons. The trouble is not confined to any definite area nor to any single estate over a long period.

Rubber.

Para rubber has become the main crop on many plantations, but the low market price of the product has stopped development, and on many estates tapping has been suspended entirely. The rubber expert appointed during the year had not yet arrived.

Cacao.

This crop has been very disappointing, and on most estates is now being abandoned. It is hoped that as a result of experiments carried over a series of years, a type of cacao may be evolved which will give an economic return.

Sugar.

Sugar cane grows well in all parts of the Protectorate, and the acreage is extending rapidly. Jaggree is manufactured for local consumption, but there is no doubt that when the industry receives more attention Uganda will produce its own sugar and be able to export to surrounding territories. On the Government Plantation, Kampala, small areas of various kinds of cane are being grown experimentally, which include the best varieties from Mauritius and the West Indies, and some tons are now available for planting purposes. A small crushing plant has been erected, and the experimental manufacture of jaggree is being carried on, details of which are to be found in the plantation report.

Flax.

The Empire Flax Growing Committee is anxious to extend the supply of flax, and small experiments have been undertaken. A supply of flax can be obtained for local manufacture, but it is not expected that it will be possible to export the product.

Oil Seeds.

There is ample scope for the extensive production of various oil seeds, particularly sim-sim and groundnuts, but exports are limited by the high freights both on land and sea.

More reasonable freights will result in greater activity being made in the local production of such low-priced products.

Miscellaneous Crops.

Wheat, maize, rice, tea, chillies and tobacco are well established crops, and efforts are being made to extend their cultivation. In Singo wheat is now being more largely grown, whilst rice is making progress in Bunyuli. Chillies are being encouraged as their production can be extended quickly and give a good return to the producer.

Miscellaneous Products.

Many enquiries are being received with reference to the manufacture of paper, paper pulp, and power alcohol from some of the many natural resources of the country. The Department of Scientific and Industrial Research is experimenting with cotton seed, elephant grass, and papyrus for the production of power alcohol.

Agricultural Education.

In a country like Uganda all progress is really dependent on the development of agriculture, and under existing circumstances one of the best forms of education that can possibly be given is demonstration in improved agricultural methods. The resources of the producers are thus enlarged, enabling the community to develop on sound lines. It is hoped that a School of Agriculture will soon be started on which will be built a system for carrying the principles underlying agricultural practice throughout the whole country.

Importation of Plants and Seeds.

During the year the local customs offices were closed so that the regulations in force with regard to the importations of plants and seeds have been practically a dead letter. Representations have been made on the matter, but no satisfactory scheme can at present be sanctioned.

Distribution of Plants and Seeds.

Large numbers of plants and seeds are distributed from all Government Plantations to every part of the Protectorate. The Botanic Gardens, Entebbe, distributed the following :—

PLANTS.		SEEDS.	
Economic.	Decorative.	Economic.	Decorative.
1,031	4,813	Para rubber 10,000 Various packets 756 Various 52	Various packets 116 Various 7½ lbs.

The Government Plantation, Kampala, distributed the following :—

Name.		Plants.		Seeds.
Coffee, various	...	—	...	24½ lbs.
Cacao	..	—	...	2 pods
Para rubber	..	6,525	...	100 seeds
Tea	...	51	...	500 "
Sugar cane	...	11,031 canes	...	—
Fruit and Economic	...	1,130	...	117 packets
Decorative	...	1,029	...	17 "
Various, mostly food crops	...		...	749 lbs.

Ploughing.

Peripatetic ploughing schools have been maintained in the Teso and Lango Districts. There is a keen demand for ploughs, but the high prices ruling make it impossible for many to purchase who would otherwise gladly make use of such implements.

Live Stock.

The Live Stock Farm to improve the quality of the various domestic animals cannot yet be started, but it is hoped that Loan Funds may be made available for this purpose.

Government Plantations.

The reports of the various plantations are enclosed and give in detail the work carried out during the year.

Veterinary.

During the year the Veterinary Division was formed into a separate department on the appointment of a Veterinary Adviser.

Entomological.

The Entomological report is enclosed.

Botanical.

The Botanist has now been appointed Mycologist, and the Acting Botanist's report is enclosed.

Imperial Institute and Kew.

As in previous years, numerous samples of products and specimens of plants have been forwarded to the above Institutions, and some of the reports are given in the Appendices. This help is highly appreciated.

Plant Pests Board.

The work of the Board was resumed during the year, and as there are no special officers, this is chiefly of an advisory nature.

The Factories Board.

Monthly meetings were held in the Agricultural Office. Owing to the large increase in the number of cotton ginneries the Board had a busy year.

The Produce Protection Ordinance.

Nothing further has been done towards strengthening this Ordinance on the lines suggested by planters, although several meetings took place to discuss this subject.

Kampala Swamp.

An average of 15 labourers only was employed by this Department during the year. The work consisted mainly in keeping the planted area clean and extending the area under sugar cane.

Agricultural Statistics.

These are given in the Appendices, and the figures can only be regarded as approximately correct. The statistics are divided into four sections, *viz*:— Native, European, Indian and Mission agriculture, and thanks are recorded to all who have helped in the collection.

Meteorological Returns.

These are to be found in the Appendices. Fuller particulars are printed in the Blue Book.

S. SIMPSON,

Director of Agriculture.

REPORT

ON THE

GOVERNMENT PLANTATION, KAMPALA,

for the 9 months ended 31st December, 1920.

On my return from leave in May, 1920, I took over the Plantation from Mr. Hazel, and remained in charge until the end of the year.

Labour.

2. There was a good supply of local labour during the period under review, but owing to the shortage of kasanvu labour, there were several months when there was not

sufficient labour to cope with the work. Fortunately, during the last four months of the year, the help of 20 prisoners was obtained and these made good the deficiency.

Meteorology.

3. The rainfall for the year was rather below the average, but was well distributed, and the weather generally was favourable for the growth of the crops. Comparative rainfall records for the last six years are given below, together with the monthly average shade temperatures for 1920.

Rainfall: Comparative Records for Six Years.

MONTHS.	1915		1916		1917		1918		1919		1920	
	No. of days.	Inches.	No. of days.	Inches.	No. of days.	Inches.	No. of days.	Inches.	No. of days.	Inches.	No. of days.	Inches.
January ...	5	·69	10	·81	13	3·54	8	1·37	2	·05	6	3·33
February ...	12	4·90	11	4·90	17	6·14	4	·56	12	8·97	6	·65
March ...	15	4·01	15	4·40	7	4·18	11	1·97	12	8·18	15	4·38
April ...	14	5·60	15	4·68	19	8·63	19	5·41	20	5·16	17	4·74
May ...	18	4·56	17	4·81	18	8·10	13	4·93	14	3·29	21	5·48
June ...	14	4·33	17	3·22	12	4·46	11	3·29	6	1·79	14	3·24
July ...	6	·36	5	·87	3	·23	4	·89	10	1·36	15	4·69
August ...	10	2·77	15	2·58	14	4·29	12	4·55	11	3·54	10	2·92
September ...	12	4·52	16	9·46	16	8·58	10	3·47	15	6·64	11	4·45
October ...	14	5·23	15	4·60	12	5·33	14	2·64	15	3·45	18	3·50
November ...	18	6·33	12	3·13	4	1·60	12	1·50	16	5·04	20	5·58
December ...	13	3·84	10	5·42	6	·52	7	1·79	13	2·76	15	3·39
TOTAL ...	151	47·14	158	48·88	141	55·60	125	32·37	146	50·23	168	46·35

Monthly Average Shade Temperatures, 1920.

MONTHS.	7 A.M.		2 P.M.		Maximum Temperature.	Minimum Temperature.	Highest Maximum Temperature.	Lowest Minimum Temperature.
	Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.				
January ...	65·40	63·20	82·51	72·42	86·16	63·26	91·00	60·00
February ...	66·72	64·00	85·20	72·62	86·41	62·20	91·00	59·00
March ...	67·48	65·22	72·32	69·30	79·90	61·55	92·00	62·00
April ...	66·36	64·63	77·33	70·63	78·90	63·80	83·00	62·00
May ...	65·74	64·22	77·06	72·00	78·22	62·35	82·00	60·00
June ...	64·70	63·60	76·23	68·96	77·76	61·90	82·00	59·00
July ...	64·06	62·80	74·83	71·87	76·09	61·48	80·00	60·00
August ...	62·87	61·61	76·96	73·29	78·25	60·74	84·00	60·00
September ...	63·46	62·26	78·40	73·40	80·96	61·23	90·00	60·00
October ...	64·93	63·80	79·67	74·96	82·35	61·87	86·00	60·00
November ...	65·30	64·23	79·80	74·66	81·76	61·90	88·00	60·00
December ...	65·51	64·48	80·61	74·93	83·22	62·45	88·00	60·00

Distribution of Plants and Seeds.

4. During the nine months under review, the following were distributed for planting purposes:—

Name.	Plants.	Seeds.
Coffee, various ...	—	24½ lbs.
Cacao ...	—	2 pods.
Para ...	6,525	100
Tea ...	51	500
Sugar Cane ...	11,031 canes	—
Fruit & Economic ...	1,130	117 packets.
Decorative ...	1,029	17 "
Various, mostly food crops ...	—	749 lbs.

In addition to the above, over 6,000 lbs. of maize and smaller quantities of beans, Soya beans, millet, etc., were issued, but of which no information is available as to whether they were used for planting purposes or not.

Coffea arabica.

5. None of the plots received any special treatment during the year, beyond the ordinary pruning and weeding.

The "coffee bug" (*Antestia orbitalis*, var. *faceta*) was not troublesome, except on the "Bourbon" plot, where it caused some damage, the $\frac{1}{2}$ acre plot yielding only 51½ lbs. of parchment coffee this year as compared with 426 lbs. for the previous year.

"Coffee leaf disease" (*Hemileia vastatrix*) was rather prevalent during a few months, especially in July, but fortunately favourable growing weather prevailed, and it was not followed by much "die-back" (*Colletotrichum coffeanum*), which was not much in evidence during the year.

Most of the plots have suffered considerably from "soil wash." Lines of "Lemon Grass" planted across the slopes during the last few years are now proving useful in checking this erosion, especially where they are on the contour. On the other hand, it must be admitted that where the lines of grass are very close to the coffee trees, the latter suffer to some extent. Contour drains with deep holes in front at intervals to retain the heavy rains, would probably prove better suited for the purpose. Plots 11, 12, and 13 are shaded with *Grevillea robusta* trees planted 28' × 28' apart. The shade was too heavy, and was thinned in June by lopping off the branches of alternate trees up to a height of about 20 feet. This, however, was not sufficient, and the branches of remaining trees will have to be lopped. *Grevillea robusta* has one serious fault as a shade tree, and that is that the large leaves falling on the coffee trees remain there until they rot, are dislodged by strong winds, or steps are taken to remove them by hand.

The coffee under shade suffered quite as much from "leaf disease" as that not under shade, and at present there is not much difference in the trees. When the records of the yields have been kept for a few more years they should prove whether there is any advantage in shade or not.

Comparative records of the yields of the different plots, together with a few notes on the treatment they have received, are given in the tables which follow. It should be noted that the low yields for 1917-18 are due to the attacks of the "coffee bug," and those for 1919-20 to a large number of trees having been stumped and "parrot-sticked" following on a period of drought. The crop for the present period is a very fair one, and the best average crop since 1916-17. It should be noted that the nine months included practically all the picking season, as very little coffee is ordinarily picked from January to March.

Coffea arabica. Nyasaland variety I.

No. of Plot.	Area in acres.	Average Yield of Parchment Coffee per Acre.							Remarks. (Treatment).					
		Previous Records.						Present Record.	1913	1914	1915	1916	1917	1919
		1914-15	1915-16	1916-17	1917-18	1918-19	1919-20							
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.						
1	·85	363	300	819	20	504	121	351	Manured with Basic Slag and Cow Manure.	—	Manured with Egyptian Phosphates.	—	All irregular trees stumped.	All irregular trees stumped.
2	1·46	82	130	598	59	204	70	408	—	—	60 % of trees stumped.	—	do	—
3	1·50	91	176	445	6	445	98	317	—	—	—	—	do	—
4	1·00	231	730	94	—	264	114	151	—	Manured Cotton Seed. 21 lbs. per tree.	Manured Liquid Cow Manure.	Mulched Lemon Grass Stumped to 3'	—	Severely pruned March 1919.
5	·45	212	437	762	—	195	181	201	—	—	—	—	All irregular trees stumped.	—
6	·44	365	852	792	—	202	—	528	Manured with Basic Slag.	—	Severely pruned.	—	do	"Parrot-sticked" January, 1919.
7	·70	397	1,167	675	—	112	—	409	—	—	do	—	do	do

Plots 1—3, planted April—May, 1911, 6' × 8'
 " 4—5, " May, 1912, 8' × 8'
 " 6—7, " August. 1912, 7' × 7' triangular.

Coffea arabica. Nyasaland variety II.

No. of Plot.	Area in acres.	Average Yield of Parchment Coffee per Acre.					REMARKS.		
		Previous Records.				Present Record.			
		1914-15	1915-16	1916-17	April, 1917 to March, 1920				
		lbs	lbs	lbs		lbs.			
8	1'00	No record	560½	1,323	No records	134½	—	—	Parrot-sticked January, 1919.
9	'70	do	592	765	do	502	Mulched with Lemon Grass, 1915.	—	do
10	'75	do	No record	949	do	218	—	—	do
11	'75	do	do	733	do	319	—	—	do
12	'45	do	do	844	do	486	Mulched with Elephant Grass, 1915.	Shaded with Grevillea robusta.	do
13	'70	do	do	517	do	347	Manured Egyptian Phosphates, 1915.		do

Plots 8-9, planted August, 1912 7' x 7' triangular.

Plots 10-13, planted March, 1913, 7' x 7' triangular.

Coffea robusta.

6. Growth has been excellent and the trees have not been troubled with "leaf disease" to anything like the same extent as *C. arabica*.

The young plots, progeny of selected trees of plot No. 1, are doing well, and are commencing to ripen their first crop.

The older trees had an excellent crop on them, but, unfortunately, it did not commence to ripen until December, with the result that the figures of yields given are not a true indication of the crop. Some idea, however, may be gathered from the fact that the amount picked during this one month exceeded that for the previous year.

So far the comparative yields per acre are not greatly in excess of those for *C. arabica*, but judging from my own observations, I am of the opinion that *C. robusta* will give much higher yields than *C. arabica* in this country, always providing that the seed is obtained from a reliable source. How important this matter of good seed is, may be judged from plot No. 3, the seeds of which were obtained locally (near Kampala), and have proved of little use.

As regards quality, this is not equal to *C. arabica*, as will be seen in the recent Imperial Institute report on samples sent from this Plantation. It is possible that the trees on the young plots from selected trees may produce coffee of a higher quality and samples will be sent for report as soon as available. Concerning the other types of *C. robusta*, Bwebza, Canephora, Quilou, Mubendi and Mukono, so far there is no indication that any of them will prove better than the Toro type as regards yield and growth. Samples of these will be sent home for report as regards quality, and small plots of the best types will then be planted. In the meantime records of the yields are being kept for future reference.

Comparative yields of the three old plots are given in the following table:—

No. of Plot.	Origin.	No. of Trees.	Area.	Date Planted.	Average Yield of Parchment Coffee.										Distance planted apart.
					Per acre.					Per Tree.					
					1916-17	1917-18	1918-19	1919-20	Present record.	1916-17	1917-18	1918-19	1919-20	Present record.	
					lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	
1	Toro or Congo	190	'62	March, 1914	604	1,359	258	333	505	2	4'5	'85	1'10	1'65	12' x 12'
2	Local ...	246	1'00	Sept. 1914	—	160	20	31	86½	—	'69	'081	'12	'35	Half area 12' x 12' remainder 15' x 15'.
3	Bwamba Forest	160	'50	May, 1915	—	614	102	81	382	—	1'92	'31	'25	1'19	12' x 12'.

Coffea excelsa.

No. of Plot.	Variety.	No. of Trees.	Area.	Date Planted.	Distance apart.	Average Yield of Parchment Coffee.					
						Per acre.			Per tree.		
						1918-19	1919-20	Present record.	1918-19	1919-20	Present record.
1	Culture No. 2	195	1 acre	Sept. 1915	15' x 15'	lbs. 90	lbs. 22	lbs. 68	ozs. 7.39	ozs. 1.8	ozs. 5.57
2	Plyendel 1	120	.62 "	do	do	42	44	152	3.47	3.66	12.60
3	Plyendel 2	65	.33 "	do	do	12	70	98	1.00	5.66	8.00

7. This species makes quite a large tree and does not appear to reach its full bearing capacity until about five years from planting.

Of the three varieties grown, the seed of which was obtained from Java, Culture No. 2 is by far the strongest grower, and besides developing a strong main stem, the primary branches are also very stout. The berries of this variety are about the same size as *C. arabica*.

The varieties known as Plyendel No. 1 and No. 2 are very variable, individual trees differing considerably as regards habit and the size of berry, though the latter is usually large and approaching those of *C. liberica* in size. They are not so strong growing as Culture No. 2, though they make quite large trees. The trees on all the plots were carrying a heavy crop at the end of the year, but hardly any coffee was picked until January, so that the figures of the yields, which are given in the foregoing table, cannot be taken as representing the true state of the crop.

It is rather unfortunate that the crop should ripen at this time as the hot day weather of this period acts detrimentally to the ripening coffee and to the trees, and at the time of writing "die-back" has been observed on a number of trees in plot No. 1 (Culture No. 2). The other plots do not appear to have been affected to the same extent, but it should be mentioned that these are shaded with *Caesalpinia dasyrachis*.

"Leaf Disease," though sometimes present on the leaves, does not appear to have done any serious damage up to the present. Judging by the recent Imperial Institute report on samples forwarded from the Plantation the quality appears to be somewhat similar to *C. robusta*, and it is stated that this type of coffee is not usually saleable in England, though there is sometimes good demands for it in other countries.

As it takes so long for the trees to reach full bearing, and the trees grow so high as to make the picking difficult work, branches often being broken by the pickers in their endeavours to reach the coffee while standing on some insecure support, *C. robusta* would appear to be much preferable to this type, and, though it is advisable to continue the cultivation of the established plots in order to obtain more complete and informative records, I do not recommend any further extension in its cultivation for the present.

Coffea liberica.

8. These trees do not seem to be making such strong growth as *C. excelsa*, the primaries especially being very weak and in some cases not strong enough to carry the crop of large berries which they are bearing. The berries are very large, but the beans are not so large as one might expect, owing to the thickness of the skin. It has one advantage over *C. excelsa* in its earlier bearing qualities, but it is doubtful if this makes up for its less vigorous growth.

The 40 trees were planted in March 1916, and yielded 2 lbs. or .8 oz. of parchment coffee in 1919-20, and 17 lbs., or 6.8 ozs. per tree during the present period. There was still a lot of coffee on the tree at the end of the year.

Para Rubber.

9. The series of tapping experiments commenced in 1917 have been continued. Soon after my return from leave it was noticed that the trees were not yielding well and that there were a lot of trees not yielding at all. Investigation revealed the fact that the trees were not being tapped sufficiently deep, and when this was rectified the non-yielding trees were reduced to nil until the end of the year, when a few in some series began to go dry.

The yields, which are given in the tables which follow, are in most cases, considerably higher than those for the previous year, though the period is for only nine months.

Para Rubber—Tapping Experiments—I.

No. of Series	No. of Trees in Series	Birth at March 1920.	System of Tapping	Number of Tappings.				Total Yield of dry Rubber.				Average yield of dry Rubber per Tree				Average area of Bark Excised per Out.				Average Number of Tappings per Inch.				Average for the Year of non-yielding Trees.			
				1917-18	1918-19	1919-20	Present record	1917-18	1918-19	1919-20	Present record	1917-18	1918-19	1919-20	Present record	1917-18	1918-19	1919-20	Present record	1917-18	1918-19	1919-20	Present record	1917-18	1918-19	1919-20	Present record
1	23*	inches 29'6	V. $\frac{1}{2}$ surface alternate days	146	154	138	117	lbs. oz. 20 2	lbs. oz. 25 0	lbs. oz. 17 4	lbs. oz. 36 9	oz. 13'00	oz. 16'00	oz. 11'50	oz. 25'48	inches 7'70	inches 9'30	inches 7'85	inches 7'58	18'90	16'56	17'59	15'44	1'18	2'26	4'16	1'66
2	25	28'6	V. $\frac{1}{2}$ surface alternate days	147	155	138	117	15 2	16 0	16 0	41 9	9'06	10'24	10'24	26'60	7'90	7'10	9'22	7'28	18'60	21'83	14'96	16'07	40	2'55	2'45	1'6
3	22*	20'2	1 cut $\frac{1}{2}$ surface alternate days	147	155	141	117	22 15	28 14	23 8	40 13	14'70	18'05	16'84	29'68	8'20	9'80	9'68	7'42	18'00	15'81	14'57	15'76	88	1'44	66	66
4	22*	29'5	1 cut $\frac{1}{2}$ surface alternate days, changed $\frac{1}{2}$ yearly	152	150	143	116	21 12	24 12	25 12	47 0	13'90	15'84	18'72	34'18	9'40	5'60	6'17	6'41	16'17	23'25	21'57	18'09	59	1'52	61	NH
11	50	26'7	1 cut $\frac{1}{2}$ surface alternate days	137	155	143	117	31 10	37 14	35 0	89 8	10'10	12'12	11'20	28'68	8'20	10'80	9'18	7'70	16'70	14'35	15'38	15'19	2'35	1'32	2'70	3'00
12	48*	28'1	1 cut $\frac{1}{2}$ surface alternate days	150	142	145	117	35 12	40 15	49 7	93 6	11'40	13'10	15'68	31'12	9'70	8'30	9'14	7'15	15'40	17'10	15'86	16'36	139	1'02	2'41	33
13	50	26'4	1 cut $\frac{1}{2}$ surface daily	283	307	284	231	50 18	55 10	39 11	106 6	16'00	17'08	12'70	34'04	12'10	15'90	15'39	15'17	15'60	20'00	18'45	15'22	2'56	3'07	2'41	3'00
5	25	28'7	2 cuts $\frac{1}{2}$ surface alternate days	147	156	143	117	23 14	23 0	19 8	28 4	15'30	14'72	12'48	18'08	9'00	10'00	9'40	7'70	16'30	15'60	15'00	15'19	70	1'42	50	1'33
6	25	29'4	2 cuts $\frac{1}{2}$ surface alternate days, changed $\frac{1}{2}$ yearly	151	152	143	115	22 5	23 0	18 13	31 11	14'03	14'72	12'04	20'28	10'30	10'70	8'19	8'15	14'60	14'29	17'46	14'11	1'18	73	4'00	88
7	25	27'64	1 cut $\frac{1}{2}$ surface alternate days	147	156	139	117	16 2	16 8	24 0	36 1	10'03	10'56	15'36	23'08	9'40	7'60	9'23	8'07	15'60	20'52	15'06	14'49	1'00	97	1'75	44
8	24*	28'9	1 cut $\frac{1}{2}$ surface alternate days, changed $\frac{1}{2}$ yearly	151	152	140	117	16 8	17 6	25 12	38 13	10'03	11'12	17'16	25'87	9'80	9'20	8'45	7'00	15'40	16'53	16'56	16'71	77	84	5'00	44
9	50	27'3	1 cut $\frac{1}{2}$ surface alternate days	137	153	143	117	16 2	22 6	26 6	61 14	5'16	7'16	8'44	19'80	9'40	7'60	8'52	6'88	14'50	20'13	16'78	18'45	2'21	3'41	75	1'33
10	47*	27'9	1 cut $\frac{1}{2}$ surface alternate days, changed $\frac{1}{2}$ yearly	140	152	145	117	19 0	30 13	33 5	60 0	6'00	9'90	10'66	20'42	7'40	6'60	7'40	7'04	18'90	23'03	19'59	16'61	1'59	1'90	5'70	55
14	50	27'4	1 cut $\frac{1}{2}$ surface daily	231	310	284	233	38 8	60 10	33 8	78 0	12'03	19'04	10'72	24'96	12'80	17'20	17'00	16'50	18'80	18'02	16'70	14'12	3'00	2'27	4'66	2'22
15	50	30'7	1 cut $\frac{1}{2}$ surface daily	106	310	284	233	10 6	44 8	45 13	107 15	12'10	14'28	11'66	34'54	6'00	19'00	17'00	16'37	17'60	16'31	16'70	14'32	6'68	4'55	4'50	2'00

* See remarks in table II.

Para Rubber—Tapping Experiments II.

No. of Series.	Tapping Period.	Total number of Tappings.	Biscuit Rubber.	Scrap Rubber.	Total Rubber.	Average yield per Tree.	Average area of Bark Exposed per cut.	Average No. of Tappings per inch.	Average number of Trees not yielding.	REMARKS.
			lbs. oz.	lbs. oz.	lbs. oz.	oz.	inches.			
1	20th April, 1917 to 31st December, 1920	...	80 3	18 12	98 15	65.93	32.43	17.11	2.31	25 trees previous to 1st April, 1917, 24 trees 1st Ap. 1919 to 31st March 1920, 23 trees 1st Ap. to 31st Dec. 1920.
2	" " "	...	72 1	16 10	88 11	56.76	31.50	17.68	1.39	Formerly on $\frac{1}{4}$ surface, now on $\frac{1}{3}$ surface.
3	" " "	...	98 13	17 5	116 2	78.77	35.10	15.95	.91	25 trees previous to 1st Ap. 1919, 23 trees 1st Ap. 1919 to 31st March, 1920, 22 trees 1st April to 31st Dec. 1920.
4	" " "	...	103 1	16 3	119 4	82.64	27.58	20.34	.68	25 trees previous to 1st April, 1919, 22 trees from that period onwards.
11	15th May, 1917 to 31st December, 1920	...	176 9	17 7	194 0	62.12	35.88	15.38	2.34	
12	" " "	...	200 2	19 6	219 8	71.48	34.29	16.15	1.28	
13	26th May, 1917 to 31st December, 1920	...	233 12	18 12	252 8	80.80	58.56	18.01	2.76	50 trees previous to 1st April, 1920, 48 trees 1st April to 31st December, 1920.
5	23rd April, 1917 to 31st December, 1920	...	77 13	16 13	94 10	60.58	36.10	15.59	.98	These trees now require resting for at least one year.
6	" " "	...	76 10	19 3	95 13	61.32	37.34	15.02	1.69	
7	" " "	...	76 15	15 12	92 11	59.32	34.30	16.29	1.04	
8	" " "	...	81 9	16 9	98 2	64.18	34.45	16.22	1.63	25 trees previous to 1st April, 1919, 24 trees from that period onwards.
9	15th May, 1917 to 31st December, 1920	...	112 6	14 6	126 12	40.56	32.40	16.97	1.92	
10	" " "	...	126 8	16 12	143 4	47.46	28.44	19.47	2.43	50 trees previous to 1st April, 1920, 47 trees 1st April to 31st December, 1920.
14	26th May, 1917 to 31st December, 1920	...	192 10	18 0	210 10	67.40	63.50	16.66	3.03	
15	19th December, 1917 to 31st December, 1920.	933	191 9	17 1	208 10	66.76	58.27	16.01	4.43	

NOTE:—The trees were planted in 1910. All series were rested for one month, from 22nd February to 21st March, 1920.

It should be noted that the tapping area was near the base of the trees in most series during the period under review. As regards the different systems of tapping, it is not advisable to lay too much stress on the figures in any one series, owing to the variations in the yield of individual trees, the difference in tappers, and similar factors. However, I think it may be said that the V cut on one-half and one-third surface offer no advantage over the single cut on the same surface, especially when the extra time taken in making the V cut is taken into consideration.

The system of two cuts on one-quarter surface on alternate days has nothing to recommend it, and it is questionable whether two cuts one above the other are advisable as the higher cut appears to hinder to some extent the renewal of the bark of the lower cut. One cut on one-quarter surface daily would probably be preferable to two cuts on alternate days.

The single cut on one-half surface on alternate days has given very satisfactory results, and in one series has yielded as much rubber as the same cut on daily tapping. One disadvantage of this system is that when the trees get older the cut becomes very long, and where the surface of the tree is at all irregular there is a tendency for the latex to run down the tree at some points instead of running right into the cups. The single cut on one-half tapped daily is a very undesirable system owing to the rapidity with which the bark is used up, and the series tapped on this system now require resting for at least a year.

The single cut on one-third surface, both daily and on alternate days, has given quite satisfactory results as compared with the same cut on one-half surface, when we take into consideration the smaller amount of bark removed. Daily tapping, however, on this system is rather too severe, as it hardly allows of sufficient time for bark renewal.

It has been noted, not only here but on several plantations in Uganda, that the amount of rubber obtained during the first three months of the year is usually smaller than that obtained for a similar period during the remainder of the year. This being so, it would seem advisable to adopt the daily tapping on one-third surface for nine months of the year, 1st April to 31st December, resting the trees for the other three months, as offering the best return of rubber with the least expenditure of bark and labour. By only tapping nine months of the year sufficient time would be allowed for proper bark renewal on this system.

The change-over system still has very little to recommend it. The yields are perhaps slightly higher than those for similar series which are not changed over, but even if this were due to the system of changing over, and not to any other factors, the amount is not sufficient to warrant the extra work entailed, and the disadvantages of having two sides of the trees in tapping at one time.

There has not been any improvement in the paring, rather the reverse. This is due to two experienced tappers leaving and two learners having to be trained.

"Black Thread" disease has been very serious, especially towards the end of year. In August some 80 trees were treated with 5% Microlineum and 2½% was used daily from that date onwards as a preventative. In October 67 trees which had suffered rather severely from the disease were pared and painted with Stockholm tar. At this time the disease was found to be the most serious in the series tapped daily, No. 13 having 22%, No. 14 42%, and No. 15 20% of the trees affected. The highest percentage in the alternate day tapplings was 14% in series No. 9. The strength of the Microlineum used as a preventative was increased to 5% from this time onwards. In spite of this the disease continued to increase, and in December it was found that 48.25% of the total trees tapped were affected, though in many cases only slightly, while in series 13, 84%, and in series 14 and 15, 62% were affected. Most of the trees were being tapped near the base, and this probably had some influence on the disease, as in series No. 1, which was being tapped at 1½ feet from the ground, only three trees or 12.50% were affected.

It was decided to rest the trees and try a different fungicide. At the time of writing 2% Izal is being used daily and is proving effective, though it must be admitted that since recommencing tapping the weather has been mostly dry, while the last four months of 1920 were wet.

"Brown Bast" Disease is not very prevalent, and only two cases were noted during the year. These were pared and treated with absolute Microlineum, but this has not proved effective, and the stripping method will be tried in future. Another tree, not at present being tapped, has since been noted affected with the disease. This tree was only tapped for a very short period, previous to the present series of experiments being commenced, and it is rather remarkable that "Brown Bast" should

have developed. Three trees have died from different forms of “die-back”, but only one of these was due to *Botrodiploia theobromæ*, one of the others being “water-logged”, and the cause of the death of the other not being determined, though an undescribed species of *Phomopsis* was present on the cortex. No root diseases have been noted.

Tea.

10. A good crop of seed has been obtained from plot 1,—500 being distributed and 6,000 being sown in the nurseries. Plucking has been continued on plots 2 and 3, though the latter has not yet reached its full yielding capacity owing to the large number of young plants which have been planted to fill up vacancies during the last two years. 558 were planted in plot 3 and 639 in plot 4 during the year. There are still a few vacancies in plot 3 and a lot in plot 4.

The yield of prepared tea from plot 2, which is $\frac{1}{2}$ acre in area, was 153 lbs. for the nine months under review. The records of the weight of leaf plucked were only kept for the last seven months, the total being 1,053 lbs., and during this period 127 lbs. of prepared tea were obtained, so that the amount of leaf per pound of prepared tea was 8.29 lbs. 18½ lbs. of prepared tea were obtained from plot 3, the amount of leaf per pound of prepared tea in this case being 9 lbs. The tea is prepared in the most primitive manner as no machinery is available.

“Mosquito Blight” (*Helopeltis sp.*) has done a little damage to some bushes and is accompanied by a fungus, *Pestalozzia sp. Colletotrichum camellia*, though present, has not done much damage. No remedial measures have so far been necessary against either pests or diseases.

Cacao.

11. A number of poor and useless trees in the old area have been cut out and the area has been divided into plots of about one acre each. Records of these will be kept, and the best yielding plots will be maintained for experimental purposes, while the remainder can then be cut out in order to give the Para trees a better chance. The Para have given quite useful shade up to now, but they have not been tapped, otherwise there would no doubt have been much trouble from bark diseases.

Cacao Yields.

10½ Years.									Theobroma Cacao Forastero.									13 feet × 13 feet.								
Red Variety.									Yellow Variety.																	
No. of Tree.	Previous Records.						Present record.	Total Yield for 6½ years.	No. of Tree.	Previous Records.						Present record.	Total Yield for 6½ years.									
	1913-14	1914-15	1915-16	1916-17	1917-18	1919-20				1913-14	1914-15	1915-16	1916-17	1917-18	1919-20											
10	8	9	16	5	10	1	17	66	1	12	53	44	44	25	—	6	184									
16	8	4	26	16	87	51	19	211	3	28	64	91	30	35	4	5	257									
21	11	17	25	61	55	3	60	232	9	19	10	39	46	151	32	26	323									
22	11	61	37	56	12	57	86	320	18	2	12	25	14	5	76	45	179									
24	9	7	58	—	—	19	—	93	19	3	44	36	95	131	23	63	395									
26	6	8	4	14	11	25	57	125	23	3	30	122	99	151	80	115	600									
27	4	12	52	41	3	7	14	133	25	9	17	57	5	90	3	—	181									
29	11	44	97	70	40	16	51	329	28	4	73	110	58	48	6	18	312									
31	9	28	46	31	26	15	21	176	30	9	31	13	3	5	116	46	223									
32	2	55	95	47	63	89	22	373	39	1	3	61	15	7	13	16	116									
35	8	26	22	7	20	127	30	240	45	8	87	114	67	25	13	79	393									
36	11	12	28	26	88	77	31	273	49	6	2	51	11	70	26	33	199									
37	4	3	36	28	32	12	4	119	52	11	29	34	17	20	35	19	165									
38	7	64	30	90	50	9	12	262	53	14	13	77	22	46	1	—	173									
40	1	27	33	37	20	3	—	121	54	3	12	34	5	1	3	—	58									
44	2	8	11	4	—	20	16	61	58	6	1	41	14	28	6	—	96									
48	7	44	53	53	65	14	69	305	61	4	22	44	39	52	16	1	178									
55	1	28	84	29	49	5	29	225	68	10	5	84	24	49	12	59	243									
56	4	3	10	48	19	—	1	85	70	6	22	11	6	7	4	21	77									
60	4	5	32	7	19	13	3	83	76	16	—	49	9	7	1	4	86									
71	5	5	74	65	102	17	81	349	79	3	15	19	10	13	—	1	61									
72	8	76	54	75	98	61	33	405	82	46	94	57	5	78	48	87	415									
74	15	22	67	33	47	20	26	230	—	—	—	—	—	—	—	—	—									
75	24	21	53	116	123	155	79	571	—	—	—	—	—	—	—	—	—									
24	180	589	1043	959	1039	816	761	5387	22	223	639	1213	638	1039	518	644	4914									
1913-14*	7.5	—	—	—	—	—	—	—	—	10.13	—	—	—	—	—	—	—									
1914-15	—	24.54	—	—	—	—	—	—	—	—	29.04	—	—	—	—	—	—									
1915-16	—	—	43.45	—	—	—	—	—	—	—	—	55.13	—	—	—	—	—									
1916-17	—	—	—	39.95	—	—	—	—	—	—	—	—	29.00	—	—	—	—									
1917-18	—	—	—	—	43.29	—	—	—	—	—	—	—	—	47.23	—	—	—									
1919-20	—	—	—	—	—	34.00	—	—	—	—	—	—	—	—	23.54	—	—									
1920.*	—	—	—	—	—	—	31.70	—	—	—	—	—	—	—	—	29.27	—									

* Yield for 9 months only.

NOTE :—No records for 1918-19.

The number of mature trees remaining in the old area is 1,020, and the total number of pods picked was 20,442, weighing 14,306½ lbs., so that the average number of pods per tree is 20.03, which is practically the same as for the previous year, though in this case the period is nine months only. The amount of dry cacao obtained was 885 lbs. or .86 lb. per tree. The number of pods required to give one pound of dry cacao was thus 23.08. This is very high and may be due to the number of pods damaged by diseases and pests. Records of the diseased and healthy pods were kept separate during the last four months, and from these it was found that while on the average good pods weighed .798 lb., diseased pods averaged only .418 lb. It was also noted that the wet seeds averaged 16% of the weight of the pods, and that the percentage of dry cacao to the weight of the pods picked was 6.18%.

The yields of the numbered trees, which are given in the accompanying table are much similar to those of the previous year, though really higher if the shorter period is taken into consideration. As in order for cacao to be a success a yield of 1½ lbs. of dry cacao per tree is desirable, this would mean some 33 or 34 pods per tree, judging by the figures so far obtained. This yield has been maintained by the numbered trees on the average for the last five years, but the average yields of the unnumbered trees is still much below this figure. This points to the low average yield being due to using seed for propagation purposes from trees which are poor bearers.

There has been a good increase in the yields from the younger plots, but the number of mature trees in these plots is still low when we consider that the trees were planted six years ago. There is also still quite a number of vacancies in these plots which require filling. The total number of pods obtained from these plots was 4,710, weighing 2,720 lbs., and average number of pods per mature (bearing) tree was 18.25. The amount of dry cacao obtained was 157 lbs., so that 30 pods were required in this case in order to produce 1 lb. of dry cacao. The yields of four of these younger plots are given below:—

No. of Plot.	Variety.	Area.	No. of trees Bearing.	Total Pods.		Av. No. of Pods per Bearing tree.		Shade.
				1919-20.	1920.	1919-20.	1920.	
		acres.						
1	Calabacillo Red	1	58	209	1,419	3.60	24.46	Caesalpinia.
2	Forastero Red	1	44	189	1,047	4.29	23.79	"Rain Tree"
3	do.	1	43	59	431	1.37	10.02	do.
4	Forastero Yellow	.50	82	233	1,619	2.81	19.74	do.

Planted in 1914, 15' × 15', No. 1 in March, No. 2 in July, No. 3 in October, and No. 4 in November.

Pests and diseases have been about average, "scale" insects, "Mosquito Blight," pod diseases, canker, and "die-back," are the most common. The two latter often cause trees to die right back, but they can often be rejuvenated by a sucker arising from the base. No remedial measures have been carried out against the above beyond the cutting out and burning of diseased branches, and the collecting and burning of diseased pods.

Sugar Cane.

12. The interest in this crop continues to increase and 11,031 canes have been issued for planting purposes.

A small three-roller bullock or hand-power crushing mill was erected on the plantation in August, and crushing experiments were commenced the same month. The arrangements for boiling the juice were very primitive, being an ordinary open pan over an open fire. No lime water was added to the juice except on one occasion early in the experiments when it was not a success owing to the poor quality of the lime, however, as the juice was boiled immediately after being expressed, there was not much necessity for the addition of lime.

The experiments were kept as uniform as possible, 200 lbs. of cane being cut daily and the juice expressed and evaporated the same day. After being passed through the mill once, the rollers were tightened and the cane passed through once more. The reason for only 200 lbs. being crushed was due to the capacity of the boiling pan being limited to the quantity of juice obtainable from this amount of cane. On the juice being sufficiently evaporated it was poured into shallow wooden boxes about 3' × 3' and with sides six inches high, and was kept stirred with wooden paddles for about half an hour or one hour. If the sample was a good one it was then dry and granulated, and afterwards was sieved to separate the fine sugar from the lumps. In bad samples the sugar did not break up into fine particles but remained solid. The time taken to

evaporate the juice was usually from five to six hours, but varied according to weather conditions. In the following tables of yields, etc, it is the solid sugar which is described as jaggery, and the granulated which is called muscovado sugar. The percentage of first quality muscovado sugar shown, is the percentage of sugar which passed through the sieve which had about 80 holes per square inch. This fetched a much higher price locally than that which did not pass through.

Name of Cane.	Sugar Cane Analysis at Nairobi.								Sugar Cane Crushing Experiments at Kampala.									
	Description of Samples.			Results of Analysis. Calculated on canes as received at the laboratory.					Number of Tests.		Percentage of Juice.		Percentage of		Percentage of Muscavado sugar of 1st quality.	Number of times Sugar was.		
	Original Weight.	Weight when Analyzed.	Loss.	Moisture.	Juice.	Sucrose calculated on juice.	Sucrose calculated on weight of Cane.	Upland.	Swamp.	Upland.	Swamp.	Muscovado Sugar.	Jaggery.	Dry.		Moist.	Wet.	
lbs.	lbs.	lbs.	%	%	%	%	No.	No.	lbs.	lbs.	lbs.	lbs.	%	No.	No.	No.		
No. 3. "Red" ...	43	41	2	70.85	89.83	21.04	18.90	22	1	58.04	66.00	11.25	10.50	56.90	20	1	24	
Sealey's Seedling ...	41	39	2	73.17	90.66	19.14	17.35	3	2	56.16	65.00	11.66	11.12	64.64	3	1	1	
Ceylon Cane ...	31	30	1	73.17	90.15	18.70	16.86	...	2	...	58.15	...	10.62	...	...	1	1	
No. 1. "Black" ...	38	33	5	72.95	89.76	18.52	16.62	2	...	59.25	...	...	10.87	...	...	1	1	
No. B. 3922. ...	27	26	1	72.78	89.93	17.91	16.10	...	3	...	60.18	...	10.58	...	...	...	3	
Uba. ...	15	14	1	70.65	89.06	17.03	14.99	...	4	...	51.25	8.83	10.00	41.86	3	...	1	
Striped Ribbon, ...	39	27	12†	72.73	88.66	16.51	14.64	...	3	...	60.33	10.83	...	50.38	3	...	...	
Black Tanna ...	47	38	9†	73.06	89.44	16.41	14.67	1	1	53.75	62.25	11.00	11.00	29.28	1	1	...	
Java Cane ...	39	32	7	73.99	90.34	16.23	14.66	...	2	...	60.50	...	11.25	...	...	...	2	
Striped Bamboo ...	47	46	1	74.82	89.63	15.57	13.96	6	1	60.58	62.00	11.04	10.75	52.92	6	...	1	
No. D. 74 ...	40	31	9†	73.55	88.83	15.57	13.83	...	3	...	56.58	11.25	9.75	45.55	1	1	1	
No. B. 4596 ...	38	32	6	70.13	87.72	15.51	13.61	4	...	57.68	...	10.75	...	63.95	4	...	...	
White Tanna ...	50	43	7	74.79	91.02	15.45	14.06	...	4	...	62.06	11.00	10.83	52.84	1	3	...	
No. B. 1528 ...	29	28	1	73.07	89.71	15.43	13.84	...	4	...	61.93	10.88	...	67.74	4	...	...	
No. 2. "Native" ...	30?	31	...	80.26	94.05	13.17	12.38	...	2	...	65.50	...	9.50	...	...	...	2	
No. D. 131 P. ...	44	27	17†	74.67	89.05	13.68	12.18	...	2	...	50.87	...	9.12	...	...	...	2	

† Portion of Sample possibly lost in transit.

‡ Due to bad boiling.

It was noted that in the case of some varieties, mostly those growing in the swamp, the sugar was always of poor quality. Whether this was due to the soil in which the cane was growing, to the difficulty of ripening the cane in swampy ground, or to the variety of cane, has not yet been determined, but the varieties which at present are only grown in the swamp are now being planted on upland in order to see what difference this will make. It is possible that the addition of lime-water would have had good effect in these cases but this would have upset the uniformity of the experiments. The table given shows fairly clearly which varieties have proved the best, but in some cases further tests are necessary in order to obtain a fair record. Generally speaking, an average of 10 % or 11 % of muscovado sugar was obtained from the best varieties.

Samples of the different varieties of cane were sent to Nairobi for analysis and the results are also given, but owing to the time which elapsed between the cutting of the cane and the analysis, the figures are not so reliable as they would have been if they had been carried out on the spot.

Records of the yield of cane per acre are not available except for two varieties, as it has not been possible to deal with the cane in such a way as to obtain reliable records. In only one case was all the cane cut from the plot during the period under review, and this was the variety known as Sealey's Seedling. The area was .45 acre, and the amount of cane cut 20,314 lbs. which is equal to 20 tons per acre. Almost all the cane was cut from the variety No. 3 "Red," which was .30 acre and yielded 15,246 lbs. or equal to 22 tons per acre. 2,600 lbs., the remainder of the cane from this plot, was cut during the following January and February, which would make the yield of this plot equal to 26 tons per acre. I think it may be assumed that given fairly good conditions, from 20 to 30 tons per acre may easily be obtained. The two varieties mentioned above were planted on upland in March, 1917, and this is the third crop. The time required for the cane to reach maturity is 15 months from planting, and about 12 months after each cutting.

No serious pests or diseases have yet been noted. *Leptosphaeria sacchari* is usually present on old leaves, but does not appear to affect the growth of the cane to any extent.

Fruit and Economic Plants.

13. 18 young plants of *Phyllanthus distichus* and 10 of the Avocado Pear were planted out in May. No other additions were made to the fruit plot, but a lot of seeds were obtained and distributed or sown in the nurseries. The trees most useful in this respect were *Anona muricata*, *Citrus spp.*, and *Eriobotrya japonica*. *Anacardium occidentale* and the Avocado Pear are now fruiting and should give a good supply of seed for 1921.

Flax.

14. Two small plots were sown in March and April. Both were rather badly laid by heavy rains in May. Part of each plot was pulled for fibre and the remainder left for seed. The length of the straw was from $2\frac{1}{2}$ to 3 feet. Particulars of the yields, etc., are given below;—

No. of Plot.	Date sown.	Area.	Date Pulled.	Yield of Straw.		Yield of Seed.	
				Total.	Per Acre.	Total.	Per Acre.
				lbs.	lbs.	lbs.	lbs.
1. For Fibre ...	13-3-20	45 acre	31-5-20	650	1,444	63	140
1a. For Seed ...	do	30 "	22-6-20	464	1,546	51	170
2. For Fibre ...	5-4-20	20 "	22-6-20	350	1,750	21	105
2a. For Seed ...	do	10 "	22-7-20	242	2,420	17	170

22 lbs. of seed were sown in the first plots, and 21 lbs. in the second.

Two retting experiments were carried out. In the first case the flax was immersed in the tank on 3-7-20 and taken out on 10-7-20. It was originally intended to immerse the flax a second time, but on examination it proved to be sufficiently retted and was therefore spread out in the sun and dried. In the second case the flax was put in the tank on 22-7-20 and taken out again on 27-7-20. After being dried and bleached in the sun it was put back again on 5-8-20, care being taken to see that the ends of the bundles which had been uppermost before were below the second time. It was taken out on 9-8-20. This sample was more evenly retted than the first sample and was of a better colour. The retting tank was not very satisfactory, being of a temporary character and the water run in from a small stream. Unfortunately during storms this stream was apt to flood and carry sediment into the retting tank. No machinery was available for scutching the flax, but a portion was scutched by the primitive methods in vogue before the introduction of machinery. This proved very wasteful, and the figures of the yields of fibre are of no value. Samples of the prepared flax were forwarded to the Imperial Institute for valuation, and in their report they state that it had been well retted but not very well prepared, and valued the best sample at £160 per ton in London in December, 1920. From this it would seem quite possible to grow flax of good quality in Uganda, but at this altitude (3,800 feet) the yield is low and the straw short and better results would probably be obtained at higher elevations such as are found in some parts of Toro.

15.

Sweet Potatoes (*Batatas edulis*).

No.	Native Name.	Date Planted.	1919.		Date Planted.	1920.	
			Date Harvested.	Yield per acre.		Date Harvested.	Yield per acre.
				tons.			tons.
1	Magabali ...	April, 1919.	Nov. 1919.	3.61	Nov. 1919.	Dec. 1920.	9.26
2	Kiwoko ...	do	do	3.35	do	do	4.39
3	Kifeje ...	do	do	5.85	do	do	12.20
4	Ngalozechwa ...	do	do	4.39	do	do	2.02
5	Munyobyia ...	do	do	6.50	do	do	10.13
6	Mugowa ...	do	do	4.39	do	do	11.85
7	Nakamogoli ...	do	do	1.9	do	do	10.74
8	Nakitembe ...	do	do	3.81	do	do	7.03
11	Nsenjebekere ...	do	do	4.90	do	do	2.05
12	Buwala ...	do	do	5.33	do	do	10.43
9	Muzikiza ...	—	—	—	Dec. 1919.	do	2.88
10	Kyanika ...	—	—	—	do	do	.60
13	Waligo ...	—	—	—	do	do	3.71
14	Kyebandula ...	—	—	—	do	do	1.70
15	Kayulu ...	—	—	—	do	do	1.55

The yields of the $\frac{1}{2}$ acre plots which were replanted in November 1919, are given above together with those for 1919. This year the period of harvesting is a longer one. In August the plots were attacked by the Sweet Potato Caterpillar, but spraying with Paris Green and Lime checked these pests before much damage was done. Some plots, however, suffered more than others, and it is probably due to this that the yields are low in some cases. The results of replanting potatoes on the same ground does not seem to have affected the crop to any extent, though it is not a practice which can be recommended owing to the risks of increasing pests and diseases. The yields of the other five varieties planted in December, 1919, are also given.

Wheat.

16. Seven "rust resistant" varieties were sown in March, 1920, from the 18th to the 23rd. With the exception of Nos. 14 and 11 they were sown as catch crops among the Citrus trees. No. 14 was sown on rather poor ground, most of the good surface soil having been washed away. Towards the end of May, following wet weather, all the plots were attacked by "rust", *Puccinia triticina*, Eriks, and *Helminthosporium sorokinianum*, Sacc. Fortunately in June the weather was hot and dry and checked these diseases, and most of the plots were able to ripen a fair crop. The results are given below:—

Variety.				Area.	Quantity Sown.	Date Reaped.	Quantity Reaped.	Yield per acre.
				Acres.	lbs.		lbs.	lbs.
No. 14	...	...	...	0.30	26	June	54	180
No. 11	...	...	...	0.37	22½	"	202	546
No. 1017	...	...	...	0.18	11	"	80	444
No. 13	...	...	...	0.09	9	July	33	366
No. 1019	...	...	...	0.09	9	"	40	444
No. 1012	...	...	...	0.09	4	"	64	711
No. 17, Indian	...	...	...	0.18	2½	"	12	66

Miscellaneous Crops.

Bananas.

17. Some of the plants planted in August and November 1919, are now commencing to fruit. Records of the yields are being kept.

Beans.

About 25 lbs. of various kinds were sown as catch crops in different parts of the plantation. 700 lbs. were available for distribution from this source.

Soya Beans.

Six varieties were grown as catch crops. They did not do very well, being attacked by a "leaf disease". Only 75 lbs. were available for distribution.

Yam Bean.

(*Pachyrhizus tuberosus*). This has not yet been grown on a large scale, but samples of the starch have been prepared and sent for report.

Cassava.

Seven varieties are now established and samples of the starch from each variety have been prepared and sent for report. All the crop has not yet been harvested, so no information as to the yields of the different varieties is yet available.

Cotton.

A plot .75 acre in area was sown in August, but has not done very well, the situation being too much exposed to the winds from the lake. All the crop has not yet been harvested.

Buckwheat.

25 lbs. of seed sown as a catch crop in ½ acre of *Coffea robusta* on 22-3-20 was reaped on 20-5-20 and yielded 550 lbs. or 1,100 lbs. per acre.

Maize.

Quite a lot of maize was grown during the year, mostly as a catch crop. One plot of Hickory King Maize, .72 acre in area, yielded 1,867 lbs., or 2,593 lbs. per acre. During the year 6,000 lbs. and 1,800 cobs were issued from the plantation.

Guinea Corn.

Two fairly large plots are grown, one being of the red and the other of the white variety. These were both cut down in January, and the resulting crop was reaped in July, the former yielding at the rate of 1,462 lbs. per acre and the latter 1,536 lbs. per acre. In addition to the above there are 12 other varieties grown in small plots, but these did not give much crop as they were the first. Better results appear to be obtained after the plants have been cut down once or twice. 830 lbs. were available for distribution.

Rice.

A small plot was sown without irrigation but it was a failure, being badly attacked by various diseases on the leaves and glumes.

Native Agriculture.

18. The four native agricultural overseers engaged in the work of instructing the chiefs in the cultivation of such crops as Coffee, Para, and Cacao, in the neighbouring counties, have reported monthly, but it has not been possible for me personally to inspect their work. The returns of the number of trees cultivated in these counties as given by them in July, 1920, are as follows:—

County.	Para.		Coffee.	Cacao.
	Untapped.	Tapped.		
Kiagwe	5,635	9,450	134,475	13,650
Kiadondo	6,567	8,817	38,063	2,694
Busiro	3,737	1,149	10,865	135
Mawokota	1,252	—	15,675	—
Totals	17,191	19,416	199,078	16,479

Owing to the low prices being realised at present for produce, the interest in the cultivation of the above crops has declined, but on the advent of better prices there is every reason to expect that this interest will be renewed. In the meantime every effort is being made to encourage the chiefs to keep the areas now planted clean and well cultivated in order to check the spread of pests and diseases.

J. D. SNOWDEN,

District Agricultural Officer.

ANNUAL REPORT

ON THE

GOVERNMENT PLANTATION, KAKUMIRO, MUBENDI.

The plantation is situated 19 miles north from Mubendi at an altitude of approximately 4,500 ft. The area under cultivation is 46 acres. A native overseer was in charge until I arrived and took over on July 10th.

Rainfall.

The rainfall for the period under review was below the average. Hot and dry spells were experienced during July and December, and the crops suffered somewhat from drought on both occasions. Hail fell on three occasions during August, and one hailstorm occurred during October.

The rainfall records for the last six years are given in the following table:—

MONTH.	1915-16		1916-17		1917-18		1918-19		1919-20		1920	
	No. of rainy days	Inches	No. of rainy days	Inches.	No. of rainy days	Inches.	No. of rainy days	Inches.	No. of rainy days	Inches	No. of rainy days	Inches
April	15	7·89	17	6·77	17	7·01	18	6·42	13	6·33	13	4·76
May	11	3·48	15	6·13	18	7·77	11	5·33	5	1·63	8	3·02
June	7	1·63	5	2·03	11	3·64	7	0·86	4	2·67	8	3·95
July	5	3·22	8	3·92	4	0·93	4	2·47	8	1·94	6	1·57
August	7	4·62	12	4·67	15	4·74	14	6·16	8	6·05	7	2·48
September	14	4·40	19	10·91	18	11·74	9	2·45	13	5·67	14	6·92
October	12	8·09	14	7·00	19	11·26	16	5·03	16	5·17	19	5·27
November	15	5·22	13	3·44	5	0·94	11	4·52	13	5·17	18	3·76
December	9	2·59	9	2·97	3	0·44	10	2·50	9	1·91	5	0·59
January	2	0·32	7	2·54	6	3·01	3	0·73	1	0·55	—	—
February	16	5·95	11	6·22	2	1·43	10	4·48	3	0·18	—	—
March	9	3·91	8	1·90	9	2·80	7	5·32	12	5·77	—	—
TOTALS	122	50·82	138	58·50	127	55·71	120	47·17	105	43·04	93	32·32

Coffea Arabica, Var. Nyasaland.

The area under Nyasaland coffee is approximately 21.50 acres, and includes some of the oldest *C. arabica* in the country.

The crop this year has been a poor one, mainly owing to the attacks of the Coffee Bug (*Antestia orbitalis*, var. *faceta*) which has been present on the coffee here throughout the year and did considerable damage. Pruning had been neglected during the previous year, making it difficult to deal with this pest effectively.

Particulars of the yields obtained from the various plots are given below:—

Year planted.	Area in acres.			Average yield per acre in lbs.		
1904	...	...	3.68	...	286	
1907	...	...	1.90	...	185	
1910	...	...	1.95	...	112	
1911	..	...	3.00	...	233	
1912	...	...	1.21	...	191	
1913	...	...	7.25	...	580	

In comparing these yields with previous reports it must be remembered that this table represents only the yield obtained from the October—November picking. Practically no crop at all was picked from the 1906 coffee which was interplanted with Para in 1915.

Coffea Arabica, other varieties.

One acre plots of the Costa Rica and Bourbon varieties of *C. arabica* were planted in 1918. Unfortunately both of these plots have become infected by Root Disease, so that a comparison of the two varieties is not possible at present. The Costa Rica variety seems to be more liable to be attacked by Die-back than either the Nyasaland or Bourbon varieties. The plot of Costa Rica planted in 1914 had suffered so severely from this disease that it was decided to "stump" the whole plot in July this year.

Coffea Robusta.

The two plots of *C. robusta* are doing very well, and yield good crops of a small-sized bean. This coffee is a very strong grower and appears to be difficult to control as it gets older. At Kakumiro the cherries ripen later than any of the Arabica varieties.

Coffea Species.

Coffea stenophylla planted in 1915 has practically died out, and the plot has been replanted with *C. robusta*. Seeds have been saved from the few remaining trees, and a small plot will be planted during the coming year.

Coffea excelsa planted in 1917 has yielded a fair crop of large sized beans.

Coffea eugenoides, the Nandi coffee, is doing well.

These three species are of interest more from a botanical than a commercial point of view.

Shade Trees.

Erythrina umbrosa, *E. velutina*, *Albizzia moluccana*, *Grevillea robusta* and *Leucaena glauca* are all being tried as shade for coffee.

The *Erythrin*as planted in 1916 are now quite large trees, but can hardly be termed successful shade trees, as they are subjected to attacks by insects, and are liable to become defoliated during the hottest months. In addition to this, *E. umbrosa* throws out large surface roots, a habit which should be avoided when selecting shade trees, as they deprive the coffee of a considerable amount of nourishment and moisture.

Albizzia moluccana is a quick-growing tree and gives an excellent light shade, but it is very brittle, and large branches are torn off even with only a moderate wind.

Leucaena glauca was planted amongst the robusta coffee in 1919. Up to the present these trees have made little headway, and they appear to be too slow growing to make an ideal shade tree for this district. Planted closely together this tree would make an excellent low wind-break for exposed hill-sides.

Grevillea robusta grows quickly, but is rather too compact in growth to give effective shade unless planted fairly closely together. It sheds large quantities of leaves, which form a valuable mulch on the ground, but large clusters of the deeply serrated leaves become hung up in the forks of the coffee branches and may prove dangerous harbourers of pests.

Rubber.

Three kinds of rubber trees do well here, namely, Para, Funtumia and Ceara.

Tapping is carried out on the Para only. In August two small series of trees were marked out for tapping, but it was found that tapping was being carried out so badly and bark being used up so quickly, that it was decided to use these trees solely for training the tappers, and to commence fresh series in January.

"Die-back" has necessitated the removal of several branches from time to time. "Brown Bast" has been found on two of the trees.

The following girth measurements may prove interesting.

Year planted			No. of trees	Aver. girth at 3 ft.	
1906	...	...	435	...	34.25 inches
1915	...	...	327	...	13.46 "

Cocoa.

The Cocoa planted in 1914 continues to make little headway. A few of the larger trees have flowered, but no pods have yet been produced.

Native Silkworm Trees.

No progress has been made with the cultivation of the native silkworm. The plot of *Bridelia micrantha*, var. *ferruginea*, which tree forms the good plant for the native silkworm, has been somewhat neglected, but it is hoped that by pruning and inducing plenty of young growth, new colonies of insects will be encouraged to settle here. If necessary the trees will be artificially stocked during the coming year.

Cotton.

1½ acres were put under this crop at the end of July. The seed germinated excellently, but the young plants suffered severely from the effects of a heavy hailstorm on the 6th August, and were a considerable time before they recovered. They afterwards grew away strongly and a good crop is anticipated.

During the continual wet weather experienced at the latter end of October and beginning of November, the plants were attacked by the "Grey Mildew" (*Ramularia areola*, Atk.) This disease disappeared with the advent of the drier weather in December, and beyond the loss of a few leaves no ill effects were noticeable.

Wheat.

Plots of Pusa wheats Nos. 4, 6, 11, and 12 were sown in April. A fair crop was obtained, and seed was again sown at the beginning of the rains in September. Each plot did excellently until the end of October, when "Rust" appeared and spread rapidly throughout the plots.

There was no apparent difference between the rust-resisting powers of either of the varieties. The crop was reaped early in December, the yields varying from 420 lbs. to 600 lbs. per acre. The grain was small in size and would probably lose a large percentage during milling operations. The altitude here is probably a little too low for the production of good wheat.

Rice.

Six plots of rice were sown during March in the swamp near the nursery, but owing to the swamp becoming practically dry during the drought in July, the crop was a failure. Up to July the crop had done very well, and the ears were just forming when the drought set in.

Tea.

Approximately ½ acre is under this crop, which continues to make satisfactory progress. A little difficulty is experienced in establishing the young plants, but once established they grow away strongly, and tea promises to be a successful crop here. Some of the older trees have been kept as seed bearers and have produced a fair crop of seeds, which have been sown, and as soon as a stock of young plants are available the area under tea will be extended. A small quantity of tea was prepared during the year.

A few of the older unpruned trees have been attacked by "Red Rust" (*Cephaleuros mycoides*, Karst.) The disease has been confined to the lower leaves of the unpruned trees and little damage has been done.

Cephaleuros mycoides is common in the district on the leaves of the "Nsambya" trees, (*Dolechandrone platycalyx*), and is also to be found on the leaves of an Avocado Pear tree growing on the plantation.

Fruit.

The plot devoted to the cultivation of Fruit Trees contains Oranges, Lemons, Mangoes, Avocado Pears, Loquats, Mulberries, Giant Papaws, Figs, Tree Tomatoes, Grape Vines, and Pineapples. All these do well with the exception of the Vines, which make very poor growth, and the Figs. The Figs make satisfactory growth and form good crops of fruits, which, however, drop from the trees before reaching maturity.

Endeavours are being made to propagate stocks of young fruit trees for distribution.

Useful Trees.

No additions have been made to the collection of useful trees. The collection at present contains several species of *Eucalypti*, *Cedrella toona*, *Pithecolobium Saman*, *Gliricidia maculata*, and a few others. *Cedrella toona* appears to be admirably suited for this district. It makes rapid growth and produces a timber which should prove valuable.

Cover Crops.

No experiments were carried out with cover crops, but plots of *Cassia hirsuta*, *Leucæna glauca* and *Tephrosia vogelii* were grown for seed purposes. Of these *T. vogelii* makes the most successful cover if kept cut well back.

Flax.

Flax is not a success here. It grows quickly, but the straw produced is short and inclined to be weak. The average length of the Flax straw produced from seed sown in September and pulled in December was under 30 inches.

Miscellaneous Crops.

Small plots were sown with Maize, (Hickory King and Yellow Hogan), Simsim, Buckwheat, Soya Beans, Small Millet, Native Beans and Ground Nuts.

Satisfactory yields were obtained. Most of the produce is disposed of locally or used for seed distribution purposes.

Disposal of crops for the year ending 31st December, 1920.

SOLD FOR CASH.

					Fls.	cts.
112 lbs.	Coffee @ 25 cts. per lb.	...	...	..	27	90
252 "	Millet @ 5 cts. per lb.	...	...	...	12	60
65 "	Sweet Potatoes @ 5 cts. per lb.	...	...	...	3	25
60 "	Ground Nuts @ 5 " " "	...	...	...	3	00
31 "	Beans @ 5 " " "	...	...	...	1	55
17 "	Linseed @ 5 " " "	...	...	...	0	85
	Miscellaneous crops	...	...	...	56	54

Paid to No. 3 Fees of Court, Mubendi	...	...	...	Fls. 105	69
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SENT TO KAMPALA FOR DISPOSAL.

3,429 lbs. Parchment Coffee	87 lbs. Scrap Rubber
1,008 " Buni "	56 " Linseed.
997 " Biscuit Rubber	

Return of Expenditure for the year ended 31st December, 1920.

		Fls.	cts.			Fls.	cts.
Plantation Labour for April	...	96	54	Plantation Labour for September	...	176	73
" " " May	...	63	01	" " " October	...	179	85
" " " June	...	76	71	" " " November	...	227	31
" " " July	...	192	40	" " " December	...	210	86
" " " August	...	173	42				
						Fls. 1,396	83

G. T. PHILLPOTT,

Assistant District Agricultural Officer.

ANNUAL REPORT

ON THE

GOVERNMENT PLANTATION, FORT PORTAL, TORO.

Until I took over the plantation on the 25th April, the plantation was under the charge of a Muganda overseer and very little extension had been done.

Area.

Four acres have been cleared since my arrival, making the total area under cultivation 12 acres.

Coffee.

All the trees have done very well this year, and a large crop has been picked. As the picking is still in process I am unable to give the total of this year's crop.

No serious disease has so far appeared in the Toro District.

More young trees have been planted out and all gaps filled.

Tea.

The tea trees are making excellent growth, and a large quantity of seed has been collected, the area has been increased, and 100 more trees planted out. A few trees have been distributed in the district, and more have been asked for to plant later.

Fruit Trees.

The trees are all doing very well, and more varieties should be planted, such as Peaches, Plums, Apples, Limes and Mandarin Oranges.

Other Trees.

The Para trees are not doing at all well, and their growth is so slow that it would not be advisable to plant any more.

The following seeds have been planted in the nurseries and will be planted out later: Cupressus, Mlanji Cedar, Grevillea robusta, and Eucalyptus.

Miscellaneous.

Plots of Wheat, Rice, Flax, Maize and cover crops were planted during April and September and the results given below:—

Variety.	Date of sowing.	Amount sown.	Amount reaped.	Date.
Wheat No. 17 ...	April ...	5 lbs.	68 lbs.	August
" 20 ...	" ...	5 "	108 "	"
Beans: Wilson Fine ...	" ...	1 lb.	3 "	"
" Tokia ...	" ...	1 "	2 "	"
" Eyebrow ...	" ...	1 "	4 "	"
" Manchu ...	" ...	1 "	3 "	"
" Native ...	" ...	12 lbs.	232 "	"
Maize: Yellow Hogan ...	" ...	2 "	1,836 "	sold for food.
" Hickory King ...	" ...	3 "		
Buckwheat ...	August ...	3 "	102 "	November
Groundnuts ...	" ...	8 "	Not yet harvested	
Flax ...	" ...	20 "	" "	"
Rice ...	September...	10 "	" "	"
Wheat No. 17 ...	" ...	20 "	" "	"
" No. 20 ...	" ...	20 "	" "	"
Beans: 5 varieties ...	" ...	12 in all	" "	"
Maize: Yellow Hogan ...	" ...	3 lbs.	" "	"
" Hickory King ...	" ...	3 "	" "	"

All crops are looking well, and there is promise of a good yield.

Experiments with wheat and rice have shown good results; the wheat seed was taken from plots grown at an altitude from 6,000 to 7,000 ft. and planted on freshly broken ground at an altitude of 5,000 ft. The seed germinated in about four to five days, and the ears formed two months after sowing with no signs of rust, so that two crops a year can be grown and harvested.

The rice seed was brought from the Bwamba district on the other side of the mountain, and planted on new ground on a gradual slope from 5,000 ft.; this seed took longer to germinate than the wheat, but the crop looks very promising and is showing good ears.

Flax seed was planted in August on newly dug ground; the seed germinated well, but the crop suffered a lot of damage by hail and in some places the straw was beaten flat, which made the pulling difficult without breaking the straw.

The flax was harvested in the beginning of December, and the straw averaged from 3 to 4 ft.

Touring.

Twenty-four European estates have been visited since my arrival, all districts and Sazas have been visited, as well as the Bwamba district on the other side of the Ruwenzori, where rice is cultivated on a large scale.

The wheat cultivation has again been pushed, and four power mills are working as well as a few hand mills. Most of the flour is sold to the Congo Government, who, I understand, are willing to buy about a ton a month.

Wheat grows well in most parts of Toro, and on the slopes of the mountain two crops a year are harvested.

I have been on tour four months out of the eight that I have been at Toro, and have got to know all the Sazas and Gombololas, so that next year I hope to show a larger increase in the cultivation of wheat, rice and cotton.

J. S. HARMSWORTH,

Assistant District Agricultural Officer.

ANNUAL REPORT

ON THE

GOVERNMENT SEED FARMS IN TESO DISTRICT

for the Year ended 31st December, 1920.

Staff.

Mr. P. Chandler, Assistant District Agricultural Officer, had charge of the Serere Farm throughout the year, and in addition supervised the distribution of seed from Bugondo and Agu Depots.

Mr. Fishburn, Ploughing Instructor, had charge of Kumi Farm during the greater part of the year, and in addition supervised Ploughing Schools at Kumi, Toroma and Kabiramaido.

The writer left for England on leave on the 30th September, his duties being taken over by Mr. Wickham, District Agricultural Officer, so far as the district work was concerned, Mr. Chandler having independent charge of the Seed Farms.

Serere Farm.

This farm was opened on 1st January, 1920, as stated in the last annual report, to 31st March, 1920.

Good progress was made with the work of clearing of the dense jungle and breaking up of the ground, and a total area of about 54 acres was put under crop. The following list shows the areas of the different crops:—

Cotton	42	acres	Buckwheat	$\frac{1}{2}$	acres
Rice	3	"	Sweet Potatoes ...	1	"
Maize	1	"	Sugar	$\frac{3}{4}$	"
Simsim	$\frac{1}{2}$	"	Nurseries	2	"
Tobacco	1	"			
Beans	$2\frac{1}{2}$	"	Total	54	acres.

Cotton Crops.

Cultural operations consisted of deep ploughing by Howard's Invicta Ploughs, harrowing, and the removal of all tree and grass roots by hand labour.

Sowing began in June on a separate area reserved for nine selections from the Simsa Farm. These were given half acre plots each and separated by rows of Maize.

The seed was carefully hand-picked before sowing and germination was good. The plants made vigorous growth, attaining to a great height, and branching was good.

An attack of bud maggot in August caused many of the lower buds to drop and reduced the yield of cotton considerably. In regard to this attack, it seems probable that later sowing would have given better results. The crop recovered later, and has balled on the upper branches, and at the date of this report successful results may be anticipated.

The main crop on the Farm was sown with seed from a Nyasaland selection, which has been kept under observation and propagated since 1913. An area of 37 acres was sown.

Sowing began in July and ended about the middle of August. Germination was good and the crop made excellent growth throughout.

This crop, having been later sown than the above plot, escaped in great measure the attack of flower bud maggot. Pests were generally remarkably rare, and the crop gives promise of very successful results.

It is intended to make the above crop the basis for a change of seed in the Eastern Province, which may be possible in 1923 with careful supervision of the seed supply.

The main points in favour of this selection are (a) productiveness, (b) resistance to insect pests, (c) high ginning percentage and (d) strength and uniformity of lint, and these properties have been maintained throughout the experimental period of seven years.

Cotton picking began on the 1st November, and is proceeding at the date of this report.

Minor Crops.

Rice.

Six varieties of Rice were sown in half-acre plots. The seed germinated well, but the plants wilted and died when about six inches above ground. This was probably due to the excess of acidity in the newly broken soil, and also to its physiological condition. There seemed to be a lack of water retentive power in the soil, and root development was poor.

A further small area was tried with better results.

Maize.

One acre of Maize, var. Hickory King, was sown in April and gave a yield of 1500 lbs. per acre.

Simsim.

A half acre was sown rather late in the season and gave a low yield of about 300 lbs. per acre.

Tobacco.

An acre was planted out in May and proved successful so far as growth was concerned, the leaf attaining to a great size. The leaf was, however, spoiled through lack of accommodation for drying and curing.

Beans.

Half-acre plots of several varieties were tried, and all were successful. These included Soya Bean, French Kidney Beans, and Madagascar Butter Beans. The seed has been retained for further sowing next year.

Buckwheat.

A half acre plot was sown in September on newly broken ground and proved a partial failure, due to the same causes as stated under Rice crop.

Sugar.

Some sets of the Uba and Bourbon varieties were planted near to the swamp in three plots as an experiment. Two of the plots were entirely destroyed by white ants, but the canes in the remaining plot have shown such growth as to warrant further experiment with sugar at Serere.

Sweet Potatoes.

An experiment was conducted with eight varieties obtained from native cultivation in Serere County. These have not yet been harvested.

This experiment is being carried out to ascertain the best and earliest yielder and the best quality potato. The experiment will be continued over a series of years.

Nurseries.

Numerous varieties of shade and fruit trees were raised from seed in nurseries. The former include :—

Eucalyptus, 2 var., Grevillea Robusta, Albizzia, Jacaranda, Cupressus, Prosopis Juliflora, Spathodea Nilotica and Mvule. While the latter include :—Papaw, Cherry Guava, Guava, Tree Tomato, Soursop, Velvet Apple, Passion fruit, Grenadilla, Jak fruit, Loquat, Mango, Avocado Pear, Sugar Apple, Bananas, Limes, Lemons, Oranges and Grape fruit.

A number of shade trees have been planted out in belts across the plantation to act as wind breaks and shelter for the growing crop.

A beginning has been made with an orchard in which it is intended to plant all varieties of fruit introduced into the country.

Over 500 fruit seedlings have been issued to District Commissioners and Ginners in Teso and Lango for planting at Rest-houses and Gineries.

Simsa Farm.

The past year was a favourable one for Simsa Farm. Climatic conditions were good—there were no violent storms, and the rains were well distributed throughout the growing season.

A total area of approximately 76 acres was put under crop during the year, details of which are given on a table at the end of this report.

It may be stated that practically the whole of the cultivation is done by ox-drawn ploughs and harrows, and that only the minor operations, such as sowing and hoeing, are done by hand labour, an average of about 25 porters per month only being employed.

The soil is a very light sandy loam, and it is necessary to plough in all vegetable matter in order to maintain the fertility of the soil. Nothing is burned or carried away except the stalks of the cotton plants.

Cotton Crop.

The main crop at Simsa consisted of two varieties, Nyasaland No. 32 and Allen No. 25, the former being the same seed as that sown at Serere and the latter the progeny of a selection made in 1912 at Kadunguru and propagated on the farms since then.

The crop was sown early, beginning on 1st May, and ending about 10th July. Germination was good, and there was an excellent stand of plants. The crop made good progress throughout the season and boded well, but heavy rains in October and November delayed the maturing of the bolls, and there was little or no picking done up to December 1st.

Insect pests were comparatively rare until late in the season, when stainer beetle appeared, causing much stained cotton.

Selection Experiment Plots.

From the selection plots of the previous year vide Table III. of last year's report, four plots were selected for further experiment: viz., Nos. 1, 7, 9 and 21, the three former being of the Sunflower var. and the latter of the Nyasaland var.

These were sown in 2-acre plots in June. Germination was good and the crop had a most promising appearance up to the end of December. As with the main crop, so this crop suffered from the heavy Autumn rains, and there was much stained cotton picked by the end of December.

Individual Selections.

From the previous year's crop over 50 individual selections were made. Twenty-three of these were found to be suitable for propagation, and they were sown in rows in July.

Germination was not good, due to a dry spell of weather after sowing, and resowing was necessary. The crop was favoured by the Autumn rains, and ultimately gave good results.

Green Manuring Experiment.

An interesting experiment was conducted in the ploughing in of green crops to increase the fertility of the soil.

The green crops used were the ordinary native wimbi or "bulo" and the giant bean, and both were ploughed in when they had reached their maximum vegetative stage and before flowering began.

In both cases cotton was planted soon after the ploughing in, and at the end of September the experiment looked like giving interesting results.

Minor Crops.

Areas of Ground-nuts, Maize, Beans, Buckwheat, "Bulo," "Matama," Tobacco, and Cassava were sown, and good results were obtained from those sown before the end of June. Late sowings did not do well. The results are shown in the table at the end of this report.

KUMI FARM.

This farm was again maintained as an auxiliary to the other farms and as a centre of ploughing instruction in the Teso District.

Supervision of the farm work here is left principally to a native overseer, with occasional visits from European members of the staff, and consequently the best results cannot be expected.

Cotton Crop.

The main crop on the farm was derived from a sunflower selection No. 2 from the experiment plots at Simsa of the previous year. An area of 18 acres was sown, and in addition 5 acres were sown with Nyasaland (32.)

Sowing began in June and ended in August. Early-sown crop suffered from hailstorms in September, as well as the heavy Autumn rains, and at the date of this report the later sowings promise to give the best yield.

Minor Crops.

Areas of Maize, Bulo and Beans were sown for food, of which the two former gave good results.

Ploughing Instruction.

TESO DISTRICT.

Kumi school continued during the year as the centre of ploughing instruction in Teso District, and was again well supported by the chiefs in Kumi and Bukedea counties. A total of 160 oxen and 25 boys were trained and returned to the chiefs.

There was a considerable demand for new ploughs in the above counties following on the high prices for cotton of the previous year, and at one time the supply was barely equal to the demand.

A school was opened at Toroma in Usuku county in June, but had to be closed in September on account of the outbreak of pleuro-pneumonia and quarantine restrictions. In all 40 oxen and 6 boys were trained.

In Soroti and Serere counties there was little or no interest taken in ploughing by the Chiefs. Very few new ploughs were bought, and a proposal to start a school at Soroti met with no response from the chiefs.

LANGO DISTRICT.

A site was chosen at Kabiramaido for the opening of a ploughing school in Kumam county.

Previous efforts to introduce ploughing into that area in 1913 and again in 1915 at Kelle and Ekwera failed through lack of interest by the chiefs.

It is satisfactory to report that success attended the third effort to introduce ploughing, and that the chiefs and sub-chiefs in the Kumam county showed the keenest interest and gave the school the fullest support.

The school was opened in June, and by the end of the year 84 oxen and 15 boys had been trained, while 54 oxen and 9 boys were undergoing training.

It seems likely that there will be a considerable demand for ploughs in Lango district next year. At present there are only three in the whole district.

Mr. Fishburn entered on his duties as Ploughing Instructor in February, 1920. In addition to organising and supervising the above ploughing schools he also made periodical inspections of the ploughs in use among the natives and advised as to their proper handling and repair.

Meteorological.

The tables at the end of this report show the rainfall and temperature at the two farms, Serere and Simsa, month by month during the year from 1st April to 31st December.

With regard to Serere Farm, no records were kept previous to July.

The two farms are about 15 miles apart, and the records show much similarity both as regards rainfall and temperature.

General Cotton Crop.

The past year witnessed a great effort on the part of the natives throughout the Eastern Province to increase their cotton areas. This resulted in a record area sown, which amounted to an increase of 50% in the case of Teso and 80% in the case of Lango.

In Teso the bulk of the crop was sown in July and August. In Lango a large area was planted early, more especially in Kumam county, which contributed more than half the total area. In Bukedi the crop was late planted.

TESO DISTRICT.

The earlier cotton showed signs of running to wood, and the dull showery weather of October and November delayed the ripening of the bolls, so that the yield and quality of the early sowings did not come up to expectations. A very considerable amount of damage was done by hail in the Western part of Soroti county.

The crop in Usuku county is not up to the standard of the rest of the district.

There was a notable absence of disease in the district, and the quality of the cotton harvested at the time of writing is fully up to the average of former years. Serere county promises to produce the best results both as regards yield and quality.

LANGO DISTRICT.

In this district the early cotton was not so handicapped by the dull weather in the Autumn, and the plants matured well. Some good clean cotton has been picked in Kumam county.

The need for more careful picking and sorting of cotton before marketing was increasingly impressed on all chiefs and natives in both districts.

It is hoped that by constant propaganda and advice the native will in time realise that it is all to his benefit to separate the qualities and keep the cotton free from dirt and rubbish.

This is especially the case during a time of falling prices such as at present exists, when only cotton which has been properly sorted and handled can command a price in the home market, and cotton which has been badly handled is unsaleable.

R. G. HARPER,

Senior District Agricultural Officer.

TABLE I.

Food Crop Areas and Yields, Simsa Farm, 1920.

Crop.	Date of sowing.	Acreage.	Yield.	Remarks.
			lbs.	
Ground Nuts ...	April ...	6	4,489	Good yield.
Maize ...	March—April	3	8,233 (in Cob)	Good yield.
"Bulo" ...	February ...	6	—	Ploughed in.
" ...	March—April	4	2,406	Moderate yield.
Beans (White) ...	March ...	1 $\frac{3}{4}$	—	Ploughed in.
" (Soya) ...	April—August	2 $\frac{1}{2}$	400	First sowing good, later sowing fair.
Buckwheat ...	June ...	2	276	A failure.
Matama ...	July ...	6	4,031	Half crop—too late sown.
Tobacco ...	August—Sept.	1	—	Planted too late in dry weather—a poor crop.
Cassava ...	September ...	1	—	
Maize (Red) ...	July ...	1	—	A failure—too late sown.
Beans (Black) ...	October ...	$\frac{3}{4}$	—	Poor plant, ploughed in.
Sweet Potatoes ...	July ...	2	—	Not yet harvested.

Note.—The ground nuts and soya beans have been distributed to Bukedi, Teso, Lango, Gulu and Kitgum for introduction among the natives.

The bulk of the maize was sold to the K.A.R., Turkana, @ 3 cents per pound delivered at Scroti.

TABLE II.

Meteorological Records, Serere and Simsa Farms.

(A) Serere.

Rainfall.			Temperatures.			
Month.	Rainy days.	Inches.	Aver. Max.	Aver. Min.	Highest.	Lowest.
July ...	12	3.93	86.6	63.7	91.5	60
August ...	16	6.57	86.8	64.9	92.67	63
September ...	12	6.39	87.2	64.6	93.0	61
October ...	12	2.68	86.4	64.0	92.0	58
November ...	15	3.07	86.6	65.5	92.0	63
December ...	5	0.64	89.0	65.3	95.0	64
TOTAL ...	72	23.28				

(B) Simsa.

Rainfall.			Temperatures.			
Month.	Rainy days.	Inches.	Aver. Max.	Aver. Min.	Highest.	Lowest.
April ...	10	6.47	84.0	65.9	92	64
May ...	17	11.81	85.0	65.7	91	63
June ...	13	4.81	83.4	64.6	88	63
July ...	11	4.34	81.0	64.1	90	60
August ...	14	5.00	87.25	65.09	93	60
September ...	13	6.63	86.5	64.4	95	61
October ...	13	3.08	87.9	65.5	94	62
November ...	10	3.12	87.0	67.3	92	61
December ...	1	0.25	93.3	64.0	98	59
TOTAL ...	102	45.51				

ANNUAL REPORT

ON THE

GOVERNMENT PLANTATION, BUKALASA, NEAR BOMBO.

The opening up of the above plantation commenced in May, and during the period covered by this report approximately 33 acres were brought under cultivation. During May and June the plantation was in charge of a native headman, and visits were paid by the Director of Agriculture, and Mr. A. R. Morgan, Senior District Agricultural Officer, and in July I was placed in charge.

Meteorology.

The rainfall was fairly good throughout, except for late August and early September, when there was no good rain, which at the time the cotton badly needed.

The following table gives the records of rainfall and temperatures for six months, previous to which no records were kept:—

MONTH.	RAINFALL.		TEMPERATURES.			
	No. of days rain fell.	Inches.	Average Maximum.	Average Minimum.	Highest Maximum.	Lowest Minimum.
July (*)	8	4.25	82.0	55.4	89	49
August	14	3.64	83.9	58.2	92	55
September	12	3.84	84.2	58.7	90	55
October	13	4.17	85.9	59.9	92	58
November	13	3.73	84.5	61.6	92	58
December	7	3.50	85.9	60.0	94	54
Totals	67	23.13	84.4	58.96	91.5	54.8

(*) Record for 22 days.

Cotton.

Being a cotton seed selection station, work was concentrated on sowing as much cotton as possible during the limited period available. Sowing commenced early in July and finished in the second week of August. The following table gives the acreage and number of selections sown:—

Plot.	Type.	Selection.	Sown.	Area in acres.	Commenced picking.	Days to reach maturity.
I.	Nyasaland	From Kumi	July 6th to 18th	3.5	Dec. 16th	151 to 163
II.	Allen	„ Simsa	July 22nd	2.2	„ 20th	151
III.	„	Special	July 26th to 27th	1.0	„ 27th	153 to 154
IV.	„	From Simsa	Aug. 9th to 14th	5.3	Not commenced	
Total				12.0		

Remarks.

Plot I. The reason that so many days elapsed in sowing this plot was that only a small portion of the area was in any way prepared, and digging and cleaning over the remainder of the plot delayed further sowing. Approximately half of the plot is on stony soil, which furnishes a reason why some of the cotton took a longer time to reach maturity as growth was slow and poor. The later sown cotton was on better soil, and shows more rapid growth, and a larger percentage of bolls than that on the poor soil.

Plots II. and III. About half of these plots were infested with “Lumbugu,” which was thoroughly dug out before sowing. The soil is fairly good except in a few isolated places where it is stony. Growth and boll production is fair.

Plot IV. The top half of this plot is poor soil, but growth and boll production is fairly good and even throughout.

All the plots received a check during the end of August and beginning of September, and altogether the outlook at the time was very discouraging, but in October an improvement took place, and considering the nature of the soil and the exposed position the plants have done remarkably well. The cotton already picked is not quite of the best quality, being slightly dirty, due to most of the mature bolls being in contact with the soil, through heavy rains and wind.

Selected plants have been marked off in each plot, based on their comparative freedom from pests and diseases, and boll production. Owing to the exposed position it has not been possible except in a few cases on Plot IV. to take into consideration and select plants that are erect and compact in growth, for those producing the heaviest crop of bolls have been naturally the ones to suffer with the heavy storms. Altogether 48 selections have been made, but some of these may be discarded and others replace them, besides the possibility of one or two becoming infected with disease. On Plot I. 13 selections have been made with an average of 96 bolls per plant, the highest number being 154, and the lowest 69 bolls. The selections on the other plots are not far enough advanced definitely to state the number of bolls produced, but as far as appearances go they will not produce such a quantity as those selected on Plot I.

Other Crops.

The following crops occupy the remainder of the area opened up, including the nursery:—

Crop	Area.	Crop	Area.
Rice ..	3.03 acres	Buckwheat ..	2.31 acres.
Wheat ..	.41 "	Maize ..	1.14 "
Sugar Cane ..	.40 "	Sweet Potatoes ..	.50 "
Beans ..	12.13 "	Nursery ..	1.00 "
Soya Beans ..	.08 "		
		Total ..	21.00 acres.

In addition to the above there are roughly five acres of Plantains on the plantation. The Maize, Sweet Potatoes, and Plantains are being sold to the labourers on the plantation. Three acres of Beans have been reaped and most of the seed re-sown. Of the Buckwheat 1.37 acres have been reaped and a quantity of the seed re-sown. Seeds of Buckwheat, Beans and Rice have been distributed throughout Bulemezi and Bukoba Counties to natives for sowing.

The Sugar-cane plot contains the following 16 varieties:—

1. No. 4596	7. No. 8922 White type	12. Black Cane Striped Tanna
2. Ceylon Cane	8. No. 1528	13. No. 4 Java Cane
3. Sealey's Seedling	9. Striped Ribbon from B.E.A.	14. P. 74 ?
4. No. 3 Native Cane Kiganda	10. Striped Bamboo	15. Uba
5. Black Tanna "Ebidugavu"	11. D. 181 P.	16. No. 3 Red Cane
6. White Tanna "Ebigowa"		

White ants have, unfortunately, played havoc amongst the sets, and of the above, consisting of 718 sets, only 40% have escaped. Next year a more favourable position will be found for this crop.

Nursery.

This was made during the year, and such seeds as *Grevillea robusta*, *Psidium cattleianum*, *Coffea arabica*, *Areca catechu* and various fruits were sown. Germination was low in the *Coffea* and nil in the *Areca*.

Diseases and Pests.

The following pests and diseases have been determined on the crops mentioned:—

Cotton .. Mildew ..	<i>Ramularia areola</i>	Cotton .. Cotton Stainers ..	
" .. Anthracnose ..	<i>Glomerella gossypii</i>	Beans .. Rust ..	<i>Uromyces appendiculatus</i>

A disease present on the Buckwheat has yet to be determined. Caterpillars were very troublesome on the Cotton during the months of August and September, but hand picking greatly reduced their numbers, and in November they had practically disappeared.

Miscellaneous.

An old road leading up the plantation is under repairs and being straightened, and approximately 700 yards have been completed. A rough path has also been cut to the nursery near the R. Kigwe approximately 1000 yards distance. One large and two small grass huts were erected early in the year, and later two temporary wattle and daub huts for living purposes.

The estate when purchased possessed a few native huts, and the largest of these is being utilised as a store; the remainder are useless except as temporary shelters for labour. It is to be hoped that in the coming year a permanent store will be erected for the cotton and other crops as the present wattle and daub structure is not satisfactory.

Labour.

The labour supply has not been large, averaging about 43 per month, and the average on cultivation is less, as these men were utilized for hut building and on tour.

On Tour.

During the last three months of the year three short tours were made, covering the main cotton areas of Bulemezi and Bukoba Counties. Throughout, the sowing of the cotton was late, the main months of sowing being July and August in Bulemezi, and August and September in Bukoba. The Bulemezi crop promises well, and a fair return may be expected from Bukoba. Mildew, anthracnose, and cotton stainers are present everywhere, but no serious cases were met with. Ten European estates were visited. Coffee and Rubber continue to be the main permanent crops, and Cocoa has been abandoned. Many have also sown fairly large areas with Cotton.

F. W. HALL,
Assistant District Agricultural Officer.

ANNUAL REPORT

ON THE

BOTANIC GARDENS, ENTEBBE.

This Report is for the period from the 1st April to the 31st December inclusive: nine months only. Due allowance should therefore be made when comparing the various records with those of the previous year, which were for the full year.

Rainfall.

Statistics for the last five years are given below. As will be seen, the total for the nine months is well up to the average, but unfortunately it was very unevenly distributed.

There was an abnormally heavy fall—14·28 inches—in May, this being the heaviest fall for one month since May, 1910, when the very high figure of 15·80 inches was recorded. August, September and October were very dry months, the conditions nearly approaching an absolute drought, and the Gardens suffered in consequence. The total rainfall for these three months was 4·71 inches, but this quantity does not last long under a tropical sun. Full meteorological data will be found in Appendix 18.

Rainfall for last 5 years.

Months.	1916-17.		1917-18.		1918-19.		1919-20.		1920.	
	No. of days rain fell.	Inches.	No. of days rain fell.	Inches.	No. of days rain fell.	Inches.	No. of days rain fell.	Inches.	No. of days rain fell.	Inches.
APRIL	15	5·92	23	13·30	23	10·88	19	4·84	14	7·46
MAY	11	3·96	19	9·90	11	9·05	17	10·52	21	14·28
JUNE	15	9·78	7	2·85	18	5·17	11	5·97	10	8·07
JULY	7	3·16	1	·02	7	1·89	16	7·72	7	3·32
AUGUST	12	4·53	13	1·50	10	1·75	11	2·70	7	1·52
SEPTEMBER	12	4·44	12	5·32	9	3·21	11	3·09	5	1·65
OCTOBER	7	3·04	10	5·56	7	3·05	15	3·55	9	1·54
NOVEMBER	9	3·50	6	2·71	15	4·84	9	2·97	15	3·56
DECEMBER	8	3·68	6	1·06	13	2·41	6	1·53	14	5·75
JANUARY	8	2·86	10	2·07	7	1·45	7	2·42	—	—
FEBRUARY	14	8·31	7	1·07	17	7·06	2	1·36	—	—
MARCH	3	2·19	15	3·59	17	9·00	14	4·12	—	—
TOTALS	121	55·37	129	48·95	154	59·76	138	50·79	102	47 15

Labour.

The average number of men employed was 74 of which about 33% were 'Kasanvu' labourers. The average wage paid was Fls. 6/71 per month for skilled men, and Fls. 5/28 per month for unskilled men. The above is exclusive of office staff. There has been no difficulty in obtaining sufficient labour.

Nursery.

A large stock has been maintained, and thousands of plants, both economic and decorative, have been raised and distributed throughout the Protectorate.

A summary of these distributions is given herewith. The majority were supplied gratis for planting in out-stations, the remainder being sold at a nominal cost to private individuals.

SUMMARY OF PLANTS AND SEEDS DISTRIBUTION.

PLANTS.		SEEDS.	
ECONOMIC.	DECORATIVE.	ECONOMIC.	DECORATIVE.
1,031	4,813	Para Rubber ... 10,000 Various ... 756 Packets, various ... 52	Packets, various ... 116 Various ... 7½ lbs.

Seeds have also been distributed to various Botanic Stations. A revised price list of plants and seeds was compiled. The potting-shed was blown down in May during a gale, and two smaller sheds were built in place of it. The whole of the shading over the seed beds has been re-built.

A number of interesting introductions to the Gardens have been made, a list of which is given below, showing also the source from which they were received.

Thanks are due to the Heads of the various Botanic Stations mentioned for their kind assistance with this work.

List of Introductions.

Plants of economic value preceded by an asterisk.

Name of Plant.	Source from which received.
Anemone sylvestris ...	Central Experimental Farm, Division of Botany, Ottawa, Canada.
* Anona marcgraphiana ...	The Middle—Egypt Botanic Station, Matania el Saff.
Aristolochia fimbriata ...	La Mortola, Ventimiglia, Italy.
A. sempervirens ...	" " "
Aster salicifolius ...	Central Experimental Farm, Division of Botany, Ottawa, Canada.
* Averrhoa Carambola ...	Department of Agriculture, Trinidad.
Bauhinia Richardsoni ...	La Mortola, Ventimiglia, Italy.
Callistemon coccineum ...	" " "
C. rigidus ...	" " "
Centaurea ruthenica ...	Central Experimental Farm, Division of Botany, Ottawa, Canada.
Cereus latevirens ...	La Mortola, Ventimiglia, Italy.
* Citrus Hystrix ...	Director of Forests, Port Louis, Mauritius.
Clematis lasiantha ...	Central Experimental Farm, Division of Botany, Ottawa, Canada.
C. Pallasii ...	" " "
Cytisus canariensis ...	La Mortola, Ventimiglia, Italy.
C. splendens ...	" " "
* Eugenia Jambolana ...	The Middle—Egypt Botanic Station, Matania el Saff.
* Feijoa sellowiana ...	" " "
Ficus stipulata ...	Zanzibar, via Director of Agriculture, Kampala.
* Flacourtia Ramontchi ...	Director of Forests, Port Louis, Mauritius.
Hibiscus spp. ...	Agricultural Experiment Station, Honolulu, Hawaii.
Iris pallida ...	Central Experimental Farm, Division of Botany, Ottawa, Canada.
* Lansium domesticum ...	Bureau of Agriculture, Manila, Philippine Islands.
* Loganberry ...	Bureau of Plant Industry, United States Department of Agriculture.
Opuntia Tuna ...	The Middle—Egypt Botanic Station, Matania el Saff.
* Psidium araca ...	" " "
* P. Friedrichsthalianum ...	" " "
* P. montanum ...	La Mortola, Ventimiglia, Italy.
* P. pumilum ...	The Middle—Egypt Botanic Station, Matania el Saff.
* Phaseolus vulgaris ? var. ("Taguana" Bean) ...	Bureau of Plant Industry, United States Department of Agriculture.
Sambucus racemosa plumosa dentata ...	Central Experimental Farm, Division of Botany, Ottawa, Canada.
* Terminalia Catappa ...	Director of Forests, Port Louis, Mauritius.

With reference to the "Taguana" Bean (*Phaseolus vulgaris*? var.) This bean was introduced by the United States Department of Agriculture from Paraguay in 1916.

The following inventory, covering the introduction, may be of interest:—

"The 'Taguana', or giant bean of the Guaranis, which is only a form of the common bean, perhaps the typical form from which the beans arose. But if it is botanically only a form, from the agricultural point of view it is more than a variety. This bean has been cultivated by the Guaranis certainly since a remote antiquity. The most notable peculiarity of this variety is its enormous growth. It has a long shoot which grows to 15 or 20 metres so that in a wood it climbs to the top of high trees. Cultivated without branching it develops less, but yet produces abundantly, the production keeping step with the development, so that a well developed plant will produce up to 10 kilos of clean seed." (Bertoni, *Agronomia* 5: 326—327, 1913.)

Four seeds were received the latter part of November. Of these only one germinated. This plant, however, has made good growth, and at the time of writing (the end of January) has climbed to a height of nearly six feet, with two branches, and is already bearing fruit.

None of the new introductions has yet been planted out. They have been grown on in the nursery with a view to obtaining strong plants for planting out during the Spring rains.

Lawns and Flower Beds.

The lawns generally have remained in very good condition. A little trouble was experienced during the earlier part of the year owing to most of the mowing machines getting out of repair; the arrival of spare parts from home however, solved this difficulty.

An attractive show of flowers was maintained throughout the year, except during the very dry weather. Probably the best subjects were—Roses, Cannas, Chrysanthemums, *Salvia splendens*, *Lantana Camara*, *Bougainvillea speciosa*, *Plumbago capensis* and *Brillantasia owariensis*, a bed of the last-named plant flowering for the first time.

The General Collection.

Several interesting subjects have been planted out into permanent positions during the year.

Mention may be made of the following:—

<i>Aberia Caffra</i>	<i>Phytolacca dioica</i>
<i>Allamanda Schottii</i> , var. <i>Hendersoni</i>	<i>Pinus halepensis</i>
<i>Bignonia Tweediana</i>	<i>Piper Chaba</i>
<i>Callistemon lanceolatus</i>	<i>Pithecolobium dulce</i>
<i>Cassia bacilaris</i>	<i>Prosopis juliflora</i>
<i>Cinchona officinalis</i>	<i>Robinia pseudacacia</i>
<i>Lysidice rhodostegia</i>	<i>Vangueria edulis</i>
<i>Moringa pterygosperma</i>	

It was hoped to purchase from home suitable labels for the many specimens which are not at present labelled. Money for this purpose, however, was not available and the project had reluctantly to be abandoned for the time being. This is regrettable, as a Botanic Garden without labels is of little more value than a pleasure ground.

Noteworthy plants and trees which have flowered and in most cases fruited are:—

<i>Achras sapota</i> "Sapodilla Plum"	<i>Eugenia caryophyllata</i> "Clove"
<i>Anona Cherimolia</i> "Cherimoyer"	<i>Hedychium coronarium</i>
<i>Baikiea minor</i>	<i>Magnolia magnifica</i> ?
<i>Beaumontia grandiflora</i>	<i>Melaleuca Leucadendron</i> "Cajeputi"
<i>Bignonia magnifica</i> ?	<i>Melia Azadirachta</i> "Neem"
<i>Bignonia venusta</i>	<i>Michelia Champaca</i> "Champaca"
<i>Brumfelsia uniflora</i>	<i>Monodora Myristica</i> "Calabash Nutmeg"
<i>Castanospermum australe</i> "Moreton Bay Chestnut"	<i>Moræa iridioides</i>
<i>Cassia grandis</i>	<i>Persea gratissima</i> "Avocado Pear"
<i>Cola acuminata</i> "Cola nut"	<i>Poinciana regia</i> "Flamboyante"
<i>Diospyros discolor</i> "Velvet Apple"	<i>Ravenala madagascariensis</i> "Travellers Tree"
<i>Eriobotrya japonica</i> "Loquat"	<i>Spathodea nilotica</i>
<i>Eucalyptus</i> spp.	<i>Zephyranthus rosea</i>
<i>Eucharis grandiflora</i>	

The Fernery.

Special attention has been given to the Fernery, which is undoubtedly the prettiest and most charming spot in the gardens.

At the beginning of the year it was very much overgrown with weeds, and many of the choicer ferns and other plants were in danger of being crowded out of existence. The whole Fernery was therefore carefully gone over and all the useless shrubs, etc.; cut out, resulting in very material benefit to the ferns, and at the same time opening up many delightful vistas between the trees.

No addition was made to the collection except for several plants of *Nephrolepis exaltata*, var.

Cacao.

The yields of pods are tabulated below, together with those of previous years for comparison. For the nine months, the yields from all sections were very much higher than for the previous twelve months, whilst in three sections, the yields are records for those particular sections.

The low yields last year were due, to a great extent, to the attacks of the "scale" insect which has been a very troublesome pest on cacao here, and against which various insecticidal mixtures have been tried with little success. During the period under review, lime-sulphur mixture has been used, and this has proved to be very effective, the good results being apparent in the improved yields. This pest can undoubtedly be successfully combated with lime-sulphur mixture, provided that spraying is carried out in a systematic manner. The spraying must of course be thorough, all parts of the tree being reached, but particular attention should be given to the young pods, for it is on them that the insects chiefly congregate. For this reason, it follows that the best time to spray is at the time when the trees are developing the maximum quantity of young pods. Another word may be said in favour of the use of lime-sulphur mixture. Cacao trees are always more or less infected with the "die-back" disease, and the mixture is without doubt of much benefit in this direction.

Cacao Yields.

Progressive and Comparative Records.

Plot No. 1. Planted 1901.

CALABACILLO.												FORASTERO.												
RED VARIETY.						YELLOW VARIETY.						RED VARIETY.						YELLOW VARIETY.						
Number of Pods.						Number of Pods.						Number of Pods.						Number of Pods.						
Number of Tree.	1917-18	1918-19	1919-20	1920	Total to Date	No. of Tree.	1917-18	1918-19	1919-20	1920	Total to Date	No. of Tree.	1917-18	1918-19	1919-20	1920	Total to Date	No. of Tree.	1917-18	1918-19	1919-20	1920	Total to Date	
8	54	21	48	47	170	4	266	215	172	234	887	1	68	67	69	12	216	2	129	225	112	147	613	
9	124	75	141	110	450	7	282	369	166	153	950	3	104	69	151	78	402	11	2	7	7	22	38	
12	7	36	33	42	118	10	57	42	65	85	249	17	16	108	10	35	169	16	88	56	22	21	167	
13	75	66	90	37	268	14	85	144	66	94	389	20	142	184	29	140	495	19	54	21	36	62	173	
28	5	1	7	31	44	22	312	172	199	156	839	21	114	133	59	112	418	27	18	91	24	2	185	
30	56	233	49	133	471	24	121	54	75	62	312	23	42	92	2	56	192	60	8	29	1	7	45	
32	54	77	79	44	254	29	3	10	23	4	40	18	206	128	125	96	556	90	—	19	7	19	45	
33	26	32	3	62	123	31	32	87	19	100	238	36	54	30	10	56	150							
39	22	31	21	39	113	35	65	43	24	29	161	44	16	12	22	54								
40	27	26	—	25	79	37	25	44	8	12	89	79	41	24	20	20	105							
42	72	208	22	150	452	64	23	20	11	28	82													
74	1	3	8	22	29	85	65	255	119	80	519													
76	19	24	26	45	114																			
80	57	118	71	27	273																			
82	82	135	164	209	591																			
87	9	16	—	80	105																			
TOTALS	16	690	1,103	757	1,104	3,654	12	1,316	1,455	947	1,037	4,755	10	791	851	488	627	2,757	7	279	448	209	330	1,266
Average per Tree 1917-18	43.1						109.6						79.1						39.8					
1918-19		68.9						121.2						85.1						64				
1919-20			47.3						78.9						48.8						29.8			
1920				69						86.4						12.7						47.1		

Plot No. 2. Later Plantings.

CALABACILLO.											FORASTERO.													
RED VARIETY.						YELLOW VARIETY.						RED VARIETY.						YELLOW VARIETY.						
Number of Pods.						Number of Pods.						Number of Pods.						Number of Pods.						
No. of Tree.	1917-18	1918-19	1919-20	1920	Total to Date	No. of Tree.	1917-18	1918-19	1919-20	1920	Total to Date	No. of Tree.	1917-18	1918-19	1919-20	1920	Total to Date	No. of Tree.	1917-18	1918-19	1919-20	1920	Total to Date	
49	31	10	4	59	104	43	110	33	8	28	179	41	58	18	—	18	94	34	44	35	18	70	167	
52	34	157	2	114	307	48	21	23	—	33	77	50	75	120	—	106	303	46	82	65	22	58	227	
55	10	77	12	81	180	51	6	65	—	8	79	53	149	52	—	42	243	47	50	26	—	5	81	
63	11	26	—	58	95	56	57	17	2	53	129	66	14	15	6	33	68	57	26	17	2	13	58	
65	23	69	4	40	136	67	96	63	104	167	435	72	64	132	58	122	376	58	33	31	—	67	131	
69	15	16	33	18	82	68	54	55	15	64	188	73	35	32	—	28	95	61	41	12	9	19	81	
70	26	11	3	67	107																			
71	10	29	9	50	98																			
84	37	64	—	31	132																			
TOTALS	9	197	459	67	518	1,241	6	344	261	129	353	1,087	6	395	369	66	349	1,179	6	276	186	51	232	745
Average per Tree 1917-18	21.9						57.3						65.8						46.0					
1918-19		51						43.4						61.5						31.0				
1919-20			7.4						21.5						11.0						8.5			
1920				57.5						58.9						58.2							38.7	

Para Rubber Tapping Experiments.

Owing to the necessity of thinning out the Para trees, these series of experiments are being concluded with the present year. Half of the series have been in tapping for nearly four years, and the other half for various periods between two and three years.

The tabulated record given herewith is self-explanatory, and will no doubt be found sufficiently comprehensive as a history of the series.

Reviewing the trees as a whole at the end of these experiments, there is little apparent difference between those of the lightly tapped series and those of the heavily tapped series. There are good and bad trees in all the series, the bad ones being due in most cases to overcrowding.

Of diseases, there have been several cases of the root disease which has been giving trouble for several years. This disease is believed to be *Sphaerostilbe repens*, B. & Br., but it has not been identified as such beyond doubt, as no fructifications have yet been discovered.

There has been a considerable amount of Bark Disease, *i.e.*, "Brown Bast." The series affected worst is No. 3, the oldest and most tapped one. Although the yield from this series for the present year is well up to the average, towards the end of the year many trees had ceased to yield owing to "Brown Bast," and subsequent tappings would no doubt have shown a considerable falling off in yields.

General.

Most of the main roads in the Gardens have been re-gravelled during the year. Drains have been repaired and in places new drains made.

Meteorology.

The meteorological statistics of all stations in the Protectorate have been compiled and will be found in the meteorological appendix. Statistics were forwarded as usual to the Meteorological Office, London; The Indian Meteorological Department, Simla; the Physical Service Department, Egypt, etc.

C. HAZEL,

Assistant District Agricultural Officer,
Curator, Botanic Gardens.

Para Rubber Tapping Experiments—Progressive and Comparative Records.

No. of Series.	No. of Trees in Series.	Date Planted.	System of Tapping.	Date Tapping commenced.	1917-1918.							1918-1919.						
					No. of times tapped.	Weight of Sheet Rubber.	Weight of Scrap.	Total Yield of Rubber.	Average per tree.	Girth at 3' from the ground.	Tapping period.	No. of times tapped.	Weight of Sheet Rubber.	Weight of Scrap.	Total Yield of Rubber.	Average per Tree.	Girth at 3' from ground.	Tapping period.
1	100	September, 1911	1 cut on $\frac{1}{2}$ surface alternate days.	11th September, 1917	147	89 15	14 12	104 11	1'047	22	12	59	83 0	15 11	98 11	'986	24	4 $\frac{3}{4}$
2	100	September, 1911	1 cut on $\frac{1}{2}$ surface daily.	11th September, 1917	293	144 11	26 13	171 8	1'715	21	12	119	95 2	15 0	110 2	1'10	24	4 $\frac{3}{4}$
3	50	December, 1904	V cut on $\frac{1}{2}$ surface daily.	11th September, 1917	293	240 12	23 0	263 12	5'275	40	12	119	121 0	23 14	144 14	2'88	42	4 $\frac{3}{4}$
4	100	September, 1911	1 cut on $\frac{1}{2}$ surface alternate days.	1st October, 1917	140	47 11	11 7	59 2	'59	20'5	12	51	34 7	13 3	47 10	'47	24	4
5	100	1908	2 cuts on $\frac{1}{2}$ surface daily. Changed to 1 cut 2nd June, 1919	11th December, 1917	286	398 0	47 0	445 0	4'45	31'75	12	53	66 8	8 14	75 6	'75	35	2
6	50	October, 1905	2 cuts on $\frac{1}{2}$ surface daily.	2nd June, 1919	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6A	50	October, 1905	1 cut on $\frac{1}{2}$ surface daily.	2nd June, 1919	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7	42.	1906	1 cut on $\frac{1}{2}$ surface alternate days.	15th July, 1918	...	...	...	...	...	...	...	111	178 8	43 10	222 2	5'288	37	8 $\frac{1}{2}$
8	90	October, 1905	2 cuts on $\frac{1}{2}$ surface daily.	13th August, 1918	...	...	...	...	...	...	...	197	321 13	61 7	983 4	4'257	34	7 $\frac{1}{2}$
9	50	1908	1 cut on $\frac{1}{2}$ surface daily.	1st March, 1919	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10	50	1908	1 cut on $\frac{1}{2}$ surface daily.	1st March, 1919	...	...	...	...	...	...	...	...	...	...	...	...	...	...

PARA RUBBER TAPPING EXPERIMENTS—PROGRESSIVE AND COMPARATIVE RECORDS—*continued.*

No. of Series.	1919-1920.								1920.								GRAND TOTAL.						
	No. of Times Tapped.	Average area of Bark excised. inches.	Average No. of Partings per Inch.	Weight of Sheet Rubber. lbs.	Weight of Scrap. lbs.	Total yield of Rubber. lbs.	Average per Tree. lbs.	Average girth at 3' from ground. inches.	Tapping period. months.	No. of Times Tapped.	Average area of Bark excised. inches.	Average No. of Partings per Inch.	Weight of Sheet Rubber. lbs.	Weight of Scrap. lbs.	Total yield of Rubber. lbs.	Average per Tree. lbs.	Average girth at 3' from ground. inches.	Total No. of Times tapped.	Average total area of bark excised. inches.	Average No. of Partings per Inch.	Total Yield of Rubber. lbs.	Average total Yield per Tree. lbs.	Total Tapping period. months.
1	144	11	13	145	25	170	1.7	25.6	11	117	7.3	16	169	20	189	1.89	28	467	33.3	14	562	5.62	36½
2	283	16	17.6	236	24	260	2.6	26	11	231	12.3	18.8	238	24	262	2.62	26.5	926	55.3	16.7	803	8.03	36½
3	285	20	14.2	265	38	303	6.06	42.6	11	231	10.5	22	209	25	234	4.68	46.5	928	59.5	15.5	945	18.9	36½
4	142	10	14.2	109	22	131	1.31	24.2	11	117	6.4	18.3	71	17	88	.88	26	450	31.4	14.3	325	3.25	36
5	285	16	17.8	321	34	355	3.55	36.5	11	231	13.8	16.7	316	21	337	3.37	38	855	60.8	17.2	122	12.12	34
6	232	34	13.6	208	37	245	4.9	41	9	231	32.5	14.2	177	30	207	4.14	42.3	463	66.5	13.9	452	9.04	18
6A	232	18	13	174	29	203	4.06	39	9	231	17.6	13.1	139	23	162	3.24	39.8	463	35.6	13	365	7.3	18
7	143	14	10.2	177	27	204	4.88	40	11	117	8	14.6	168	19	187	4.45	41.6	371	30	12.4	613	14.6	28½
8	285	37	15.4	282	31	313	3.48	38	11	231	28	16.5	243	23	266	2.95	40.2	713	79	18	962	10.7	27½
9	285	26	10.9	204	29	233	4.66	33	11	231	15.3	15.1	119	24	143	2.86	33.5	516	41.3	12.4	376	7.52	20
10	285	27	10.5	173	29	202	4.04	36	11	231	15.1	15.3	99	18	117	2.34	36.5	516	42.1	12.2	319	6.38	20

REPORT OF THE GOVERNMENT BOTANIST

FOR THE

Period 1st April to 31st December, 1920.

On Mr. Small proceeding on leave early in May, I took over the Botanist's work in addition to carrying out my substantive duties as District Agricultural Officer.

The time available for the work was small and for the most part has been confined to examining and reporting upon material sent in by planters and agricultural officers or obtained from the Government Plantation, Kampala.

Coffee Diseases.

2. *Hemileia vastatrix*, B. and Br., has been rather prevalent during the year and in many cases has been followed by a lot of "die-back", *Colletotrichum coffeanum*, Noack. These two fungi are responsible for the greater part of the damage done to coffee by fungi in Uganda.

Recent experiments carried out by Mr. Small point to the probability of the various *Colletotrichums* which are prevalent on coffee, cacao, tea and various fruit trees, being closely related to each other, and possibly simply variations of one and the same fungus. Pure cultures of *Colletotrichum coffeanum*, Noack., produce a *Glomerella* which is indistinguishable from *Glomerella cingulata*, (Stonem.) S. and v. Schr., and Mr. Small has found that this *Colletotrichum* will also infect cacao, and the *Colletotrichum* from cacao will infect coffee. I have also found a *Glomerella* associated with *Colletotrichum coffeanum* N. on dead twigs of coffee obtained from the Kampala Plantation.

The *Colletotrichum* on tea, *C. camelliae*, Mass., is one conidial form of *Glomerella cingulata* and another form has been found during the year on the avocado pear.

It is advisable that all "die-back" twigs should be pruned off as soon as possible and burnt.

Root diseases, *Hymenochaete noxia*, Berk, and *Sphaerostilbe repens*, B. and Br. ? do not appear to have been much in evidence during the year, and the same applies to *Cercospora coffeicola*, B. and Cke., which sometimes causes spots on the leaves and berries.

Other fungi which have been recorded on coffee in previous years but which do not appear to do much damage are:—

Fusarium coffeicola, P. Henn., *Periconia byssoides*, Pers., *Phoma* sp. and *Phomopsis* sp., all on the twigs.

Septoria coffeae Wakefield, n. sp., on leaves and twigs injured by hail.

Capnodium brasiliense, Putt., on leaves.

Polyporus coffeae, Wakefield, n. sp., on the roots of one tree.

Of phanerogamic parasites, *Loranthus usuiensis*, Oliv. var. *Maitlandii*, Sprague, occurs on the branches.

Diseases of Hevea Rubber.

3. Bark and Cortex diseases appear to be on the increase, but it is difficult to determine how much of the damage is due to "Black Thread" and how much to "Brown Bast". The causative fungi of these diseases in Uganda have not been satisfactorily determined, though the former is usually considered to be due to *Phytophthora* sp. On the Government Plantation, Kampala, it is "Black Thread" which is most prevalent, amounting to more than 50% in some series and 48.25% of the total number of tapped trees, while only two cases of "Brown Bast" have been noted. On the other hand, reports from some plantations show that "Brown Bast" is the more serious.

Planters on the whole are alive to the danger of these diseases and the remedial measures recommended by Mr. Small are being well carried out.

A few cases of "Die-back" caused by *Botryodiplodia theobromae*, Pat., have been reported, but deaths from this cause are not frequent.

Root diseases, *Hymenochaete noxia*, Berk., and *Sphaerostilbe repens*, B. and Br. ? have not been prevalent, and there is still no authentic case of *Ustilina zonata* (Lév.) Sacc., attacking Hevea.

Other fungi which have been reported on Hevea in former years but do little damage are:—

Cephaleuros mycoidea, Karst., and *Phyllosticta* ? *Heveae*, Zimmerman, on leaves.

Coniothyrium sp. causing a canker on stems and branches.

Gloeosporium alborubrum, Petch, on young stems.

Pestalozzia palmarum, Cke., and *Leptosphaeria* sp., on apices of stems.

Phoma heveae, Petch, and *Phomopsis* sp., on branches.

Megalonectria pseudotrichia, Speg., and *Fusarium* sp., on dead bark.

Tubercularia versicolor, Sacc., on healing surface of tapped bark.

Helicobasidium sp., on roots.

Cacao Diseases.

4. "Die-back" due to *Botryodiplodia theobromae*, Pat., has been rather prevalent. In some cases the disease is arrested part way down the stem, usually where several branches arise, but in many cases it kills the trees right down to the ground. Its action is very rapid, the dead leaves still remaining upon the branches, giving the tree the appearance of having been scorched by fire. Owing to unsatisfactory yields cacao has been rather neglected of late, in some cases being overgrown, and this disease is on the increase. It is advisable to cut off all diseased branches and dig up all dead trees and burn them, as the spores from these trees are capable of infecting Hevea as well as cacao.

"Rot of Pods" caused by *Phytophthora faberi*, Maubl. ? and *Colletotrichum* sp. is fairly common, as is also hardening of pods due to *Colletotrichum incarnatum*, Zimm., while *Colletotrichum theobromicola*, Del., is the cause of a "die-back" of twigs. Diseased pods and twigs should be collected and burned.

No fresh cases of root diseases, *Sphaerostilbe repens*, B. and Br., and *Helicobasidium longisporum*, Wakefield, n. sp. have been reported.

Other fungi which have previously been reported on cacao but which are of little economic importance are:—

Capnodium brasiliense, Putt., *Cephaleuros mycoidea*, Karst., and *Phyllosticta* sp, on leaves.

Megalonectria pseudotrichia, Speg., (Stilbum stage), and *Nectria flavo-lanata*. Berk. and Br., on dead stems.

Tea Diseases.

5. The leaves of tea are attacked by several diseases, the most important of which is *Colletotrichum camelliae*, Mass., which is one of the conidial stages of *Glomerella cingulata* (Stonem.) S. and v. S., which attacks both the old and young leaves, causing large blotches on them. It has also been noted on seed vessels.

A *Pestalozzia*, the species of which has not yet been determined, is sometimes found associated with the *Colletotrichum* and also on the discoloured spots caused by the "Mosquito Blight" (*Helopeltis bergrothii*, Reut., var.). It has not yet been determined whether this fungus is capable of attacking uninjured leaves.

Cephaleuros mycoidea, Karst., also attacks the leaves at times, but so far has not been responsible for much damage.

None of the above diseases have proved sufficiently serious to necessitate remedial measures, but the area under tea in Uganda is still small, and it is possible that spraying against these diseases may be necessary should any large increase in the area take place.

The root disease, *Sphaerostilbe repens*, B. and Br. ? has not been reported this year.

Diseases of Fruit Trees.

A disease causing a rot of fruits and a "die-back" of twigs of the avocado pear has been the subject of investigation. Specimens forwarded to Kew have been determined as *Glomerella cingulata* (Stonem.) S. and v. Schr., in conidial and perithecial stages. This fungus has been reported on the avocado pear in the United States, and it is stated that cross inoculations with it and forms from citrus fruits and

mangoes, have been successful on the fruits. The conidial stage of a very similar fungus has since been reported on the fruits of *Anona muricata* growing in the vicinity of the avocado pear first referred to. In 1916 a similar fungus was recorded in Uganda on fruits of the mango.

Colletotrichum glæosporioides (Pers.) Sacc., attacks the leaves and twigs of citrus and causes a certain amount of "die-back" of the branches, and *Glæosporium musarum*, Cke. and Mass. attacks the fruits of the banana. All the above belong to the group known as "Anthracnose Fungi."

Dead twigs and branches should be cut off and burned and diseased fruits collected and treated in a similar manner. Spraying with Bordeaux mixture to prevent fresh infections should prove helpful where the value of the crop warrants such a procedure.

Other fungi which have been reported from time to time are:—

Cephaleuros mycoidea, Karst., on the leaves of the avocado pear and guava.

Puccinia pruni, Pers., a "rust" on the leaves of the peach.

Sphærostilbe repens, B. and Br.; ? on the roots of the mango.

Diseases of Cotton.

6. The most important of these is *Glomerella gossypii*, Edg., with its conidial stage *Colletotrichum gossypii*, Southw., which has been reported from several districts during the year. It is responsible for a lot of damage to the bolls in wet weather, and sometimes attacks the stems.

Ramularia areola, Atk., the "Grey Mildew", has been fairly prevalent on the leaves. As a rule it does little damage but it is sometimes accompanied by a *Macrosporium* sp. which increases the injury to the leaves, causing discoloured patches, sometimes of considerable extent.

A *Fusarium* sp. has been frequently noted on diseased material but it is probable that it is chiefly present as a saprophyte.

A *Botryodiplodia* sp. has been noted causing a "die-back" of stems.

The damage done by these diseases is largely influenced by the weather and in good growing seasons is not very considerable. There is reason to believe, however, that they are on the increase and it is essential that strict attention be paid to the annual burning of the plants in order to keep them in check.

Other diseases which have previously been reported are *Cercospora gossypii*, Speg., and *Uredo gossypii*, Lagerh.

Diseases of Minor Crops.

7. *Leptosphaeria sacchari*, van Breda, is still prevalent on the leaves of sugar cane but appears to have little effect on the growth of the cane.

Puccinia triticea, Eriks., has been responsible for a lot of damage to wheat on the Kampala Plantation during the year. This is the first time it has been recorded in Uganda. It was accompanied by *Helminthosporium sorokinianum*, Sacc. ? which is also reported here for the first time.

Puccinia graminis, Pers., and *Ustilago tritici*, Jens., have not been reported this year, though the former is usually present on wheat in Toro.

The heads of *Sorghum vulgare* are sometimes attacked by *Sphacelotheca reiliana* (Kühn) Clinton, and *S. Sorghi* (Link.) Clinton, but neither of these has been reported during the period under review.

Rice grown on Kampala Plantation has been attacked by several fungi, the most important of which are a *Helminthosporium* sp. and a *Leptosphaeria* sp. The leaves of the rice are covered with yellowish-brown spots, and in mass appear as though they had been scorched by fire.

The only disease so far reported on maize is *Puccinia sorghi*, which was reported in 1919.

The leaves of *Voandezia subterranea* (mpandi) growing on the Kampala Plantation were attacked by a *Cercospora* sp. which is probably an undescribed species as no *Cercospora* has hitherto been reported on this host.

Other fungi which attack pulse crops in Uganda from time to time are:—

Æcidium vignæ, Cke., on *Vigna sinensis* (mpindi) and *V. catjang*.

Æcidium glycines, P. Henn, on *Glycine javanica*.

Ascochyta phaseolorum, Sacc. on *Vigna catjang*.

Cercospora personata, on ground-nut (*Arachis hypogæa*).

Erisyphe polygoni, D. C. on garden pea (*Pisum sativum*).

Meliola bicornis, Wint., on *Glycine javanica*.

Uromyces appendiculatus (Pers.) Lk. on beans and mpindi.

The leaves of cassava (*Manihot utilissima*, and *M. palmata*,) are frequently attacked by *Cercospora Henningsii*, Allesch., but it appears to do little harm. A similar disease, *C. Cearæ*, Petch., attacks the leaves of Ceara rubber (*Manihot Glaziovii*).

Alternaria solani (E. & M.) Jones and Grout, ? has been responsible for a fair amount of damage to the leaves of potatoes growing on the Kampala Plantation. The foliage of most of the plants was almost entirely destroyed, the growth of the tubers ceased, and they remained small and of poor quality.

The native tobacco is sometimes attacked by *Cercospora raciborskii*, which causes discoloured spots on the leaves.

In the case of annual crops affected by any of the above diseases it is advisable to burn all the straw, stems, etc., after harvesting the crop, and, if possible, it is advisable to procure fresh seed for further planting from crops which have not been attacked by the disease. With perennial crops the diseased parts should be collected and burned, and the plants sprayed with a good fungicide, should circumstances warrant such a procedure.

Herbarium.

8. A few specimens have been added to the collection but there has been little time available for collecting.

Thanks are again due to the Director of the Royal Botanic Gardens, Kew, for naming material forwarded to him for identification.

Plant Pests Board.

9. This Board resumed its sittings on the 11th October, 1920, and I carried out the duties of Acting Secretary from that date until the end of the year.

J. D. SNOWDEN,
Acting Government Botanist.

REPORT OF THE GOVERNMENT ENTOMOLOGIST

FOR THE

Period 1st April to 31st December, 1920.

I commenced duty as Entomologist on November 30th, 1920.

2. The report is compiled chiefly from the monthly reports of the Acting Entomologists, Mr. Small and Mr. Morgan, whose time was mainly occupied by their own duties and hence they could do little beyond giving advice for control of pests reported by planters.

3. No new insect pest has appeared during the period under review.

Pests of Cotton.

1. Cotton Stainer	 <i>Dysdercus pretiosus</i> , Dist.
2. " "	 <i>Oxycaræus hyalipennis</i> , Costa.
3. Boll-worm	 <i>Earias insulana</i> , Boisd.
4. "Green Fly"	 <i>Aphis gossypii</i> , Glover.
5. " "	 <i>Chlorita facialis</i> , Jac.
6. Cutworms	... Species undetermined.
7. Grasshopper	... " "

Pests of Coffee.

- | | | |
|----------------------------|------|--|
| 1. Variegated Bug | .... | <i>Antestia orbitalis</i> , var. <i>faceta</i> , Germ. |
| 2. Fruit Fly | .... | <i>Ceratitis capitata</i> , Wied. |
| 3. Berry Borer | .... | <i>Stephanoderes coffeæ</i> , Haged. |
| 4. Stem Borer | .... | Species undetermined. |
| 5. Leaf-eating Caterpillar | .... | <i>Metadrepna glauca</i> , Hmp. |
| 6. Thrips | .... | <i>Diarthrothrips coffeæ</i> , Will. |
| 7. Cutworms | .... | Species undetermined. |
| 8. Crickets | .... | " " |
| 9. "Green Fly" | .... | " " |

Pests of Rubber.

No reports were received of serious damage done by insects to this crop.

Pests of Cacao.

- | | | |
|-----------------------|------|--|
| 1. "Mosquito" Blight | .... | <i>Helopeltis bergrothii</i> , Reut., var. |
| 2. Leaf-eating Beetle | .... | Species undetermined. |
| 3. Fruit Fly | .... | <i>Ceratitis punctata</i> , Wied. |
| 4. Scale Insects | .... | Several undetermined species. |
| 5. "Green Fly" | .... | ? <i>Toxoptera theobromæ</i> , Schout. |

Pests of Sweet Potato.

1. Leaf-eating Caterpillar—*Acræa terpsichore*, Linn.

There have been serious outbreaks of this pest in Buganda Province. As the crop is cultivated almost solely by the natives, hand-collection of caterpillars was the only method practicable for control. The caterpillars are gregarious in their earlier stages of growth and if timely action be taken hand-collection of larvæ is greatly facilitated.

Pest of Mango.

1. Fruit Fly—*Ceratitis capitata*, Wied.

Millipedes.

Species of *Julidæ* were reported as injurious to miscellaneous seedlings in nursery. The pest disappeared with the advent of dry weather.

Locusts.

Three swarms of undetermined species, were reported in Gomba County during September.

- (a) Swarm proceeding West near Katonga River.
- (b) " " " " Kawala.
- (c) " in vicinity of Wabibo, confining its attention chiefly to young grass.

Plant Imports.

During the period reported on fifty-four consignments of plants and seeds were inspected from the following countries:—

United Kingdom	...	...	...	...	35
India	...	...	...	...	4
France	...	...	...	...	7
British East Africa	...	...	...	...	3
South Africa	...	...	...	...	3
Holland	...	...	...	...	2
TOTAL					54

Fumigations.

Eleven consignments of cotton, coffee and Para rubber seeds were fumigated for export to British East Africa, South Africa, India and Australia.

The Collection.

I am indebted to Mr. Uvarov through the medium of the Imperial Bureau of Entomology, London, for the identification of 24 species of Orthoptera.

Specimens of moths were received from Mr. S. Simpson; rare butterflies from Mabira Forest were donated for the collection by R. A. Dummer, Esq., Mulange Estate.

The Kampala Museum.

German War Trophies were forwarded for the museum by the Quarter-Master of the Protectorate Stores and have been placed in the museum.

New stands are being made for the display of exhibits, and when completed, the whole collection will be re-arranged.

H. HARGREAVES,
Government Entomologist.

Appendix 1.

IMPERIAL INSTITUTE OF THE UNITED KINGDOM, THE COLONIES AND INDIA.

Report on Flax Fibre and Tow from Uganda.

The samples which are the subject of this report were forwarded to the Imperial Institute by the Director of Agriculture and are referred to in his letter No. 904/301, dated the 27th September, 1920.

It was stated that the flax had been grown on the Government Plantation at Kampala.

Results of Examination.

Flax.—This sample weighed 3 lbs., and consisted of two bundles of fairly soft greenish-brown flax fibre, which had been well retted, but had not been freed from shieve, of which a fair quantity was present.

The fibre had a length of from 19 to 27 inches in the case of one of the bundles, and from 15 to 19 inches in the other bundle. The strength was variable but on the whole fairly good.

Tow.—This sample weighed 3 lbs. and consisted of matted masses of short fibre measuring up to about 15 inches in length. The fibre was similar in colour to the flax described above.

Commercial Valuation.

Samples of the fibre and tow were forwarded to fibre merchants in London, who stated that the longer fibre represented by one of the bundles was of good spinning quality and would be worth about £160 per ton in London (December, 1920); whilst the shorter fibre of which the other bundle consisted would only be suitable for breaking into tow and would realise about £80 to £100 per ton.

The firm regarded the sample of tow as rather short and brittle but suitable for the spinning of heavy yarns. They estimated its value at about £60 to £70 per ton in London.

Remarks.

The flax represented by the present samples is of fairly good quality, and it should be possible by better cultivation and preparation to remedy the defects of poor colour and shortness and irregularity of staple.

The commercial value of flax has recently fallen considerably, but it is anticipated in the trade that prices may improve again later on. When trade is more normal, large quantities of both the flax and tow represented by the present samples could probably be disposed of in the United Kingdom in lots of 50 to 100 tons at a time.

7TH JANUARY, 1921.

Appendix 2.

IMPERIAL INSTITUTE OF THE UNITED KINGDOM, THE COLONIES AND INDIA.

Report on Linseed from Uganda.

The sample of linseed which is the subject of this report was forwarded to the Imperial Institute by the Director of Agriculture and is referred to in his letter No. 904/301 of the 27th September, 1920.

The seed was stated to have been grown on the Government Plantation at Kampala.

Description.

The sample weighed 2½ lbs. and consisted of brown seeds which were considerably smaller and less plump than ordinary commercial linseed. About 20 per cent of dirt and a small amount of vegetable debris were included with the seeds.

Results of Examination.

After being freed from impurities the seed was found to contain 7·8 per cent of moisture and to yield 31·3 per cent of oil on extraction with light petroleum, equivalent to 33·9 per cent from the dry seed. This figure is rather lower than the yields of oil recorded for commercial linseed, *viz.* : 36 to 40 per cent. The oil obtained had the usual appearance of linseed oil.

Commercial Value.

Owing to the rather low yield of oil and the large proportion of dirt present, linseed of the quality of the present sample would realise a lower price than commercial supplies from India and South America, which were recently quoted in London at prices ranging from about £18 to £22 a ton.

Remarks.

The low yield of oil in the present instance is probably due to immaturity of the seed. As the seed was forwarded in conjunction with a sample of flax it is presumed that the crop was grown for fibre rather than for seed, and that the seed was therefore not allowed to ripen fully. If this the case, it might be worth while to cultivate a special plot for seed, the plants being allowed to remain in the field until the seed is fully mature. A sample of the seed thus obtained should be forwarded to the Imperial Institute for examination and valuation.

16TH FEBRUARY, 1921.

Appendix 8.

IMPERIAL INSTITUTE OF THE UNITED KINGDOM, THE COLONIES AND INDIA.

Results of the Examination of Cotton from Uganda.

DATE 10TH SEPTEMBER, 1920.

		Cotton 1.
<i>Imperial Institute No.</i>	 2170/20-1.	
<i>Reference</i>	 Letter No. 206/484, dated 16th April, 1920, from the Director of Agriculture, Uganda.	
<i>Number or mark and weight of sample</i>	 No. 1. Simsa. Weight 8 oz.	
<i>Variety of cotton</i>	 Probably American Upland.	
<i>Description</i>	 Soft and silky, cream-coloured cotton of fair lustre, with some weak and immature fibres.	
<i>Strength</i>	 Fairly good, but somewhat irregular.	
<i>Length of fibres</i>	 From 0·8 to 1·5 inch; mostly from 1·2 to 1·3 inch.	
<i>Commercial valuation</i>	 The cotton was valued at 48·65d. with "middling" American at 26·65d. per lb. (July, 1920).	

		Cotton 2.
<i>Number or mark and weight of sample</i>	 No. 2. Simsa. Weight 8 oz.	
<i>Variety of cotton</i>	 Probably American Upland.	
<i>Description</i>	 Soft and silky, cream-coloured cotton of fair lustre, with some immature fibres.	
<i>Strength</i>	 Fairly good, but rather uneven.	
<i>Length of fibres</i>	 From 0·9 to 1·4 inch; mostly 1·1 to 1·3 inch with an average of 1·2 inch.	
<i>Commercial valuation</i>	 The cotton was valued at 44·65d. per lb. with "middling" American at 26·65d. per lb. (July, 1920).	

		Cotton 3.
<i>Number or mark and weight of sample</i>	 No. 3. Simsa. Weight 13 oz.	
<i>Variety of cotton</i>	 Probably American Upland.	
<i>Description</i>	 Soft, silky, cream-coloured cotton of fair lustre, with some immature fibre. Portions of the cotton were stained a yellowish-brown colour.	
<i>Strength</i>	 Very good on the whole, but some weak fibre was present.	
<i>Length of fibres</i>	 From 0·8 to 1·4 inch; mostly 1·2 to 1·3 inch.	
<i>Commercial valuation</i>	 The cotton was valued at 49·65d. per lb. with "middling" American at 26·65d. per lb. (July, 1920).	

		Cotton 4.
<i>Number or mark and weight of sample</i>	 No. 4. Kumi. Weight 14 oz.	
<i>Variety of cotton</i>	 Probably American Upland.	
<i>Description</i>	 Soft, silky, cream-coloured cotton of fair lustre, with some immature fibre.	
<i>Strength</i>	 Good, but rather irregular.	
<i>Length of fibres</i>	 From 0·9 to 1·4 inch; mostly 1·0 to 1·2 inch, with an average of 1·1 inch.	
<i>Commercial valuation</i>	 The cotton was valued at 44·65d. per lb. with "middling" American at 26·65d. per lb. (July, 1920).	

		Cotton 5.
<i>Number or mark and weight of sample</i>	 No. 5. Serere. Weight 10 oz.	
<i>Variety of cotton</i>	 Probably American Upland.	
<i>Description</i>	 Soft, cream-coloured cotton of fair lustre, with a fair amount of immature fibre.	
<i>Strength</i>	 Good, but somewhat uneven.	
<i>Length of fibres</i>	 From 0·8 to 1·3 inch; mostly 0·9 to 1·1 inch, with an average of 1·0 inch.	
<i>Commercial valuation</i>	 The cotton was valued at 46·65d. per lb. with "middling" American at 26·65d. per lb. (July, 1920).	

Cotton 6.

<i>Number or mark and weight of sample</i>	....	No. 6. Serere. 10 oz.
<i>Variety of cotton</i>	....	Probably American Upland.
<i>Description</i>	....	Soft, cream-coloured cotton of fair lustre.
<i>Strength</i>	....	Variable; on the whole rather weak.
<i>Length of fibre</i>	....	From 0·8 to 1·2 inch; mostly 0·9 to 1·1 inch, with an average of 1·0 inch.
<i>Commercial valuation</i>	....	The cotton was valued at 46·65d. per lb. with "middling" American at 26·65d. per lb. (July, 1920).

Remarks.

Most of these samples appear to contain a certain proportion of unripe fibre, and the cottons would have had slightly better strength if they had been more fully matured. They are slightly weaker and not so well matured as the samples from Uganda examined at the Imperial Institute in 1916 (*see* Imperial Institute Report, dated 25th May, 1916) but otherwise they are very similar. The brokers stated that the high prices quoted were nominal and would be difficult to obtain at that time on account of slackness of trade.

Appendix 4.

IMPERIAL INSTITUTE OF THE UNITED KINGDOM, THE COLONIES AND INDIA.

Reports on Starch from the Tubers of the Yam Bean from Uganda.

The sample of starch which is the subject of this report was forwarded to the Imperial Institute by the Director of Agriculture and is referred to in his letter No. 211/517, dated the 16th April, 1920.

It was stated that the starch had been prepared from the tubers of the yam bean (*Pachyrhizus tuberosus*) grown on the Government Plantation at Kampala.

Description.

The sample weighed about 1 lb. and consisted of pale creamy-white starch, in the form of somewhat lumpy powder.

Results of Examination.

The starch was chemically examined at the Imperial Institute with the following results:—

					Per cent.
Moisture	....	....	....	....	13·1
Crude proteins	....	....	....	....	0·9
Fat	....	....	....	....	0·06
Starch (by acid hydrolysis)	....	....	....	....	79·1
Crude fibre	....	....	....	....	0·3
Ash	....	....	....	....	0·5

These results show that the sample contains rather more protein than is usually present in prepared starches. The amounts of fibre and ash are also rather high, indicating that the starch had not been sufficiently washed.

Remarks.

The present sample was not of very good appearance but it is possible to prepare excellent starch of pure white colour from the tubers of the yam bean. If such starch can be produced in Uganda in commercial quantities, the Imperial Institute will be glad to assist in finding a market for it in the United Kingdom.

28TH JULY, 1920.

Appendix 5.

Water Analysis Report.

Label on bottle:—Water from Director of Agriculture, Kampala.

Forwarded by:—Director of Agriculture, Kampala on 22/9/20.

No. 1086. Date 1/9/20.

Your Reference No. 1077/302 of 2/11/20.

					Parts per 100,000.
Nitrogen nitrite	....	....	....	....	Nil
Oxygen absorbed, 3 hours lab. temp.	....	....	....	....	0·245
Chlorine	....	....	....	....	Trace.
Hardness	....	....	....	....	Nil
Solid residue	....	....	....	....	3·2
Alkalinity	....	....	....	....	Nil
Sulphate	....	....	....	....	Trace.

Remarks.

As far as ascertained by chemical analysis, the water cannot be detrimental to the coffee.

ACTING SENIOR CHEMICAL OFFICER.

A. B. HOBSON,
Analyst.

CHEMICAL RESEARCH DEPARTMENT,

NAIROBI,

Report No. A/28/20.

19TH NOVEMBER, 1920.

Lab. Sample No. 1289.

Received :—12/10/20.

From :—Director of Agriculture, Kampala, Uganda.

Description of Samples.

16 BUNDLES OF SUGAR CANES.

No.	Name.	Original Weight		Weight when analysed.		Loss.
		lbs.		lbs.		lbs.
1.	Striped Ribbon ...	39	...	27	...	12*
2.	Ceylon Cane ...	31	...	30	...	1
3.	Sealey Seedling ...	41	...	39	...	2
4.	No. 1, Black Cane ... (Striped tanna?)	38	...	33	...	5
5.	No. 2, Native Cane...	30?	...	31	...	—
6.	B. 1528 ...	29	...	28	...	1
7.	D. 74 ...	40	...	31	...	9*
8.	No. 3, Red Cane ..	43	...	41	...	2
9.	B. 3922 ...	27	...	26	...	1
10.	Java Cane ...	39	...	32	...	7
11.	White Tanna ...	50	...	43	...	7
12.	Striped Bamboo? ...	47	...	46	...	1
13.	Black Tanna ...	47	...	38	...	9*
14.	Uba ...	15	...	14	...	1
15.	? D. 131 ...	44	...	27	...	17*
16.	B. 4596 ..	38	...	32	...	2

* Portion of sample possibly lost in transit.

Results of Analysis.

Calculated on canes as received at the Laboratory.

Moisture.			Juice.	Sucrose calculated		Sucrose calculated	
%			%	on juice.		on weight of cane.	
			%			%	
1.	72.73	...	88.66	...	16.51	...	14.64
2.	73.17	...	90.15	...	18.70	...	16.86
3.	73.17	...	90.66	...	19.14	...	17.35
4.	72.95	...	89.76	...	18.52	...	16.62
5.	80.26	...	94.05	...	13.17	...	12.39
6.	73.07	...	89.71	...	15.43	...	13.84
7.	73.55	...	88.83	...	15.57	...	13.83
8.	70.85	...	89.83	...	21.04	...	18.90
9.	72.78	...	89.93	...	17.91	...	16.10
10.	73.99	...	90.34	...	16.23	...	14.66
11.	74.79	...	91.02	...	15.45	...	14.06
12.	74.82	...	89.63	...	15.57	...	13.96
13.	73.06	...	89.44	...	16.41	..	14.67
14.	70.65	...	89.05	...	17.03	...	14.99
15.	74.67	...	89.05	...	13.68	...	12.18
16.	70.13	...	87.72	...	15.51	...	13.61

Remarks.

The amount of moisture lost in transit, though considerable, cannot be estimated with any degree of accuracy, and from the data available it is not possible to recalculate the above results so as to obtain the sucrose content of the canes as cut. As an approximation it may be taken that the sucrose figures calculated on the weight of cane are from 5% to 10% higher than would have been obtained by analysis of the freshly cut canes.

A. C. BARNES,
Acting Senior Chemical Officer.

Native Agriculture—Crops under Cultivation.

Province and District.	Potatoes.		Millets.		Rubbers.		Cotton.	Coffee.	Plantains.	Maize.	Dhal.	Beans.	Sim-Sim.	Sugar Cane.	Ground-nuts.	Cassava.	Tobacco.	Wheat.	Rice.	Chillies.	Cacao.	Peas.	Onions.	
	Sweet.	English.	Matama.	Wimbi.	Para.	Other.																		
A C R E S .																								
BUGANDA :—	117,000	200	200	500	750	350	30,000	3,300	367,000	4,000	*	4,000	3,000	450	1,800	1,000	100	*	180	50	50	*	*	
	9,500	150	216	200	38	504	6,000	1,000	75,000	4,000	*	2,300	614	700	2,200	1,725	100	*	*	50	6	100	*	
	509	111	64	211	2	5	11,985	7,293	71,720	1,634	*	1,729	782	..	1,016	2,746	35	17	*	3	54	917	127	
	25,000	50	1,500	10,500	3	120	10,075	600	25,000	2,000	100	2,400	2,000	100	1,300	2,500	1,000	120	50	125	..	400	..	
	TOTAL	152,009	511	1,980	11,411	793	979	58,060	12,199	538,720	11,634	100	10,429	6,396	1,250	6,316	7,971	1,235	137	230	228	110	1,417	127
EASTERN :—	*	*	*	80,000	100	*	80,000	..	*	*	*	*	*	*	*	*	*	*	*	*	*	..	..	
	*	*	*	*	*	*	30,000	..	*	*	*	*	*	*	*	*	*	*	*	*	*	..	..	
	6,000	50	25,000	50,000	..	30	63,000	100	1,500	100	50	6,000	1,000	..	6,000	100	2	..	20	..	..	5,000	..	
	*	*	*	*	*	..	27,699	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
TOTAL	6,000	50	25,000	130,000	100	30	200,699	100	1,500	100	50	6,000	1,000	*	6,000	100	2	*	20	*	*	5,000	*	
	NORTHERN :—	11,350	26	1,000	5,000	..	..	3,200	132	5,000	1,350	..	2,550	2,800	..	60	600	250	..	10	3	..	2,400	..
		Masindi	*	..	*	..	..	*	5	*	*	*	*	*	*	*	*	*	*	..	*	..	*	..
		Homa	..	..	..	..	..	2,000	..	10	500	..	..	28,000	..	7,000	700	..	..	..	..	..	14,000	..
		Gulu	7,000	..	28,000	42,000	..	..	..	25	700	..	4,500	30,000	..	800	250	20	..	550	..	..	10,000	..
TOTAL	8,000	..	31,000	45,000	..	..	80	..	..	..	..	7,050	50,800	*	7,860	1,550	270	..	610	3	..	26,400	..	
	26,350	26	60,000	92,000	..	..	5,280	137	5,035	2,550	..	7,050	50,800	*	7,860	1,550	270	..	610	3	..	26,400	..	
	WESTERN :—	12,000	5	1,000	30,000	..	..	26	8	12,000	1,000	..	20,000	1,000	400	750	500	5	1,000	15	..	..	2,000	5
		Toro	25,000	15	4,500	18,500	..	2,500	350	25,000	2,000	5	10,000	100	15	600	6,000	350	8	..	..	..	12,000	..
		Ankole	5,200	200	20,000	30,000	..	*	10	26,000	5,000	..	40,000	..	..	5	..	200	20	..	..	..	85,000	..
Kigezi		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
TOTAL	42,200	220	25,500	78,500	..	..	2,526	368	63,000	8,000	5	70,000	1,100	415	1,355	6,500	555	1,023	15	..	..	99,000	5	
	RUDOLF :—	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
		Turkvel	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
		Turkana	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
		Dabossa	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
GRAND TOTAL	226,559	807	112,480	311,911	893	1,009	266,565	12,804	608,255	22,284	155	93,479	69,296	1,665	21,531	16,121	2,062	1,165	875	231	110	131,817	132	

* Not known.

Native Agriculture—Live Stock.

Province and District.				Cattle.	Sheep.	Goats.	Horses.	Mules.	Donkeys.
UGANDA :—	Mengo	....	....	26,493	8,295	108,532	....	4	50
	Entebbe	....	....	3,179	2,555	24,317	...	1	2
	Masaka	....	....	22,590	3,689	12,555	...	....	4
	Mubendi	....	....	11,099	2,638	29,368	...	...	...
	TOTAL	....	....	63,361	17,177	174,772	....	5	56
EASTERN :—	Busoga	....	....	25,126	7,200	48,000	....	...	...
	Bukedi	....	....	118,237	*	*	....	1	52
	Teso	....	....	172,408	27,738	68,605	...	6	10
	Lango	....	....	110,401	36,369	65,837	...	4	21
	Karamoja	}	....	No basis for an estimate.					
	Lobor		....						
	TOTAL	....	....	426,172	71,307	182,442	....	11	83
NORTHERN :—	Masindi	}	....	2,193	2,973	12,459	....	...	1
	Hoima		....						
	Gulu	....	....	10,774	*	*	1	4	23
	Kitgum	....	....	20,000	5,000	5,000	....	...	100
	West Nile	....	....	40,000	20,000	48,000	....	1	4
	TOTAL	....	....	72,967	27,973	65,459	1	5	128
WESTERN :—	Toro	....	....	19,100	15,531	40,000	....	2	7
	Ankole	....	....	81,924	58,396	71,074	....	2	1
	Kigezi	....	....	*	*	*	....	*	*
	TOTAL	....	....	101,024	73,927	111,074	....	4	8
SUDOLF —	Turkwel	....	}						
	Turkana	....							
	Dabossa	....							
	GRAND TOTAL	....	....	663,524	190,384	533,747	1	25	275

* Not known.

European Agriculture.

COMPILED FROM RETURNS OF 173 PLANTATIONS.

Province and District.										Number of Estates.		Total Acreage taken up.		Total Acreage under Cultivation.		Total Acreage not Cultivated.		Acreage of Coffee (<i>Arabica</i>).		Acreage of Coffee (<i>Robusta</i>).		Acreage of Para Rubber.		Acreage of other Rubbers.		Acreage of Cacao.		Cotton.		Wheat.		Maize.		Rice.		Tobacco.		Sugar.		Tea.		Miscellaneous Crops.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									

Indian Agriculture.

COMPILED FROM RETURNS OF 19 PLANTATIONS.

Province and District.		Number of Estates.	Total Acreage taken up.	Total Acreage under cultivation.	Total Acreage not cultivated.	Acreage of Coffee (Arabica).		Acreage of Coffee (Robusta).		Acreage of Para Rubber.		Acreage of Other Rubbers.		Acreage of Cacao.		Cotton.	Wheat.	Sugar.	Tobacco.	Maize.	Tea.	Rice.	Miscellaneous Crops.
						Under 2 years.	Over 2 years.	Under 2 years.	Over 2 years.	Under 5 years.	Over 5 years.	Under 5 years.	Over 5 years.	Under 5 years.	Over 5 years.								
BUGANDA:—																							
...	...	7	1,807	739	1,068	80	260	30	...	105	...	...	...	20	20	197	...	196	...	...	...	...	36
...	...	7	1,554	1,190	364	200	340	...	1	215	160	...	...	20	20	110	...	185	...	15	...	...	144
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	5	2,493	1,068	1,425	460	450	...	5	20	20	...	...	...	...	200	...	191	...	...	15	...	...
TOTAL		19	5,854	2,997	2,857	740	1,050	30	6	340	180	...	...	20	40	507 (iii)	...	572	...	15	1	15	180 (iv)

(i) 220 acres interplanted with Coffee.
(ii) 20 " " "

(iii) 280 acres interplanted with Coffee.
(iv) 90 " " Sugar.

Appendix 12.
Live Stock on European Plantations.

Province.	Acres.										Province							Appendix 13.				
	Coffee Arabica	Coffee Robusta	Para Rubber	Other Rubbers	Cacao	Cotton					Oxen	Cows	Mules	Donkeys	Sheep	Goats	Pigs					
BUGANDA	480	26	350	115	125	154					581	400	6	...	69	162	3					
EASTERN	61	...	...	5	4	100					58	...	...	...	30	78	3					
NORTHERN	142	...	...	...	20	31					12	13	...	3	12	10	3					
WESTERN	26	...	...	4	...	...					64	106	...	6	38	...	2					
TOTALS	709	26	350	124	149	285					715	519	6	9	149	250	11					

Appendix 13.
Live Stock on Indian Estates.

Province.						
Oxen.	Cows.	Mules.	Donkeys.	Sheep.	Goats.	Pigs.
...	136	46	5	...	5	...
Buganda						

Comparative Statement of Exports from the Uganda Protectorate for the year—9 months—ended 31st December, 1920.

ARTICLES.	Unit.	From 1st April, 1920 to 31st Dec., 1920 (9 months).		From 1st April, 1919 to 31st March, 1920 (12 months).		INCREASE.		DECREASE.	
		Quantity	£	Quantity	£	Quantity	£	Quantity	£
Cotton, Ginned ...	... cwt.	170,338	3,778,931	130,464	1,209,663	39,874	2,569,268	...	...
Coffee, Husked ...	...	21,399	81,384	54,694	156,668	...	...	33,295	75,284
" in Parchment ...	...	2,373	5,617	4,266	5,046	...	571	1,893	...
" Buni ...	...	1,919	3,361	...	...	1,919	3,361	...	...
Rubber, Wild ...	... lbs.	1,890	164	2,089	90	...	74	199	...
" Plantation ...	...	312,659	23,603	388,523	25,902	...	...	75,864	2,299
Cacao ...	... cwt.	798	4,117	660	1,231	188	2,886	...	...
Chillies ...	...	2,832	10,361	5,153	10,251	...	110	2,321	...
Ground Nuts ...	...	131	215	1,135	1,388	...	...	1,004	1,173
Cotton Seed ...	...	37,477	8,990	105,457	25,783	...	...	67,980	16,793
Castor Seed ...	...	237	266	8,518	1,443	...	...	8,281	1,177
Simsim Seed ...	...	28,511	50,133	23,384	30,697	5,127	19,436	...	...
Simsim Oil ...	...	3	19	102	470	...	...	99	451
Cotton Seed Oil ...	...	161	900	335	876	...	24	174	...
Ghee (Clarified Butter) ...	...	800	5,164	3,196	15,303	...	...	2,396	10,139
Jaggree (Unrefined Sugar) ...	...	634	1,066	432	520	202	546	...	...
Hides and Calf Skins ...	...	10,130	67,554	52,171	242,238	...	...	42,041	174,684
Skins, Goat ...	...	1,647	24,912	4,200	27,870	...	...	2,552	2,958
" Sheep ...	...	86	463	95	360	...	103	9	...
" Miscellaneous ...	... value.	...	79	...	9	...	70	...	...
Hippo Teeth ...	... lbs.	5,895	735	12,891	1,074	...	...	6,996	339
Horns ...	...	1,097	1,239	327	250	770	989	...	...
Ivory ...	...	95,332	61,452	161,091	65,952	...	...	65,759	4,500
Timber ...	... cwt.	276	373	1,975	1,311	...	...	1,699	938
Bees Wax ...	...	40	257	...	...	40	257	...	...
Tobacco ...	... lbs.	306	8	...	...	306	8	...	...
Animals, Living ...	... No.	...	...	3	3	...	...	3	3
Miscellaneous Produce ...	... value.	...	1,907	...	3,395	...	...	...	1,488
Goods, Manufactured, unenumerated ...	...	...	547	...	694	...	...	...	147
Goods, Unmanufactured, " ...	...	...	319	...	50	...	269	...	...
TOTAL ...	...	...	4,134,136	...	1,828,537	...	2,597,972	...	292,373

Net Increase £2,305,599.

NOTE:—1. Values for the year — 9 months — ended 31st December, are calculated at Fls. 10/- to £1.
2. Up to the 30th September value of cotton was at the rates quoted from England, but from the 1st October, 1920, it has been computed at prices ruling in the Protectorate.

Comparative Statement of Exports from the Uganda Protectorate.

ARTICLES.	Unit.	Year ended 31st March, 1917.		Year ended 31st March, 1918.		Year ended 31st March, 1919.		Year ended 31st March, 1920.		Year — 9 months ended 31st Dec., 1920.	
		Quantity	£	Quantity	£	Quantity	£	Quantity	£	Quantity	£
Cotton Ginned ...	... cwt.	77,961	348,880	99,395	537,083	98,188	965,951	130,464	1,209,663	170,338	3,778,931
" Unginned ...	...	32	34	282	548	...	...	...	...	...	...
Coffee, Husked ...	...	31,136	81,323	15,362	33,278	50,460	102,658	54,694	156,668	21,399	81,384
Coffee in parchment ...	...	17,473	32,616	4,485	6,283	3,351	3,351	4,266	5,046	2,373	5,617
Rubber, Wild ...	... lbs.	400	40	9,362	923	14,262	620	2,089	90	1,890	164
" Plantation ...	...	71,995	5,856	144,727	9,965	253,063	12,893	388,523	25,902	312,659	23,603
Silk, Raw ...	...	2,100	70	900	100	...	...	...	...	...	...
Cacao ...	... cwt.	258	562	114	138	209	331	660	1,231	798	4,117
Chillies ...	...	13,317	27,328	9,287	18,586	5,487	6,847	5,153	10,251	2,832	10,361
Ground Nuts ...	...	3,640	1,767	954	464	896	562	1,135	1,388	131	215
Cotton Seed ...	...	109,213	10,220	44,021	7,402	33,223	6,149	105,457	25,783	37,477	8,990
Castor Seed ...	...	...	...	329	171	737	468	8,518	1,443	237	266
Sim Sim Seed ...	...	38,090	21,318	17,337	13,048	939	1,008	23,384	30,697	28,511	50,133
" Oil ...	...	387	725	230	530	27	99	102	470	3	19
Cotton Seed Oil ...	...	...	...	...	...	448	337	335	876	161	900
Beeswax ...	...	...	...	...	...	...	...	...	...	40	257
Ghee (Clarified Butter) ...	...	7,007	18,310	7,090	23,270	6,443	26,122	3,196	15,303	800	5,164
Jaggree (Unrefined Sugar) ...	...	520	310	851	668	2	3	432	502	634	1,066
Hides and Calf Skins ...	...	1,931	52,693	22,634	76,707	15,053	64,125	52,171	242,238	10,130	67,554
Skins, Goat ...	...	398,448	16,095	2,273	6,789	1,948	8,162	4,200	27,870	1,647	24,912
" Sheep ...	...	9,380	126	46	41	19	15	95	360	86	463
" Calf ...	...	127	345	...	...	...	...	...	...	...	...
" Miscellaneous ...	... lbs.	...	...	106	10	280	29	95	9	...	79
Horns ...	...	44	15	40	1	129	9	327	250	1,097	1,239
Hippo Teeth ...	...	4,800	422	2,336	156	3,265	261	12,891	1,074	5,895	735
Ivory ...	...	22,876	8,778	109,426	43,770	94,795	37,918	161,091	65,952	95,332	61,452
Timber ...	... cwt.	533	567	778	411	3,040	1,939	1,975	1,311	276	373
Animals, Living ...	... No.	1,865	6,131	41	118	417	1,985	3	3	...	...
Miscellaneous Produce ...	... value	...	1,371	...	2,331	...	2,835	...	3,395	...	1,907
Goods Manufactured ...	...	...	1,450	...	1,892	...	2,220	...	694	...	547
Goods Unmanufactured ...	...	...	443	...	10	...	60	...	50	...	319
Coffee, Buni ...	... cwt.	21	...	...	...	...	...	...	...	219	3,361
Tobacco ...	... lbs.	...	...	...	...	...	...	...	...	306	8
GRAND TOTAL ...	...	...	637,795	...	784,693	...	1,247,457	...	1,828,537	...	4,134,136

NOTE:—Values for the 9 months ended 31 December, 1920, are calculated at Fls. 10/- to the £1.

Comparative Statement of Exports—the Produce of the Uganda Protectorate—shewing Quantities and Values from the various Ports and Stations, for the Years ended 31st March, 1920, and 9 months ended 31st December, 1920.

ARTICLES.	Unit.	BUKAKATA.				ENTEBBE.				KAMPALA.				KIBANGA.			
		Year—9 months ended 31-12-20.		Year ended 31-3-20.		Year—9 months ended 31-12-20.		Year ended 31-3-20.		Year—9 months ended 31-12-20.		Year ended 31-3-20.		Year—9 months ended 31-12-20.		Year ended 31-3-20.	
		Quantity.	£	Quantity.	£	Quantity.	£	Quantity.	£	Quantity.	£	Quantity.	£	Quantity.	£	Quantity.	£
Cotton, Ginned	Cwts.	50*	4	2	16	...	21	163	32,236	741,553	39,853	374,942	...	...	...	...	...
Coffee, Hasked	"	42	184	521	1,483	108	112	321	11,537	40,575	28,473	80,676	6,735	28,770	15,053	43,439	...
" Parchment	"	...	...	...	...	101	408	477	550	1,242	1,499	1,810	369	1,364	258	304	...
Rubber, Wild	Lbs.	...	...	...	...	1890	1,855	80	...	...	...	...	...	...	...	...	...
" Plantation	"	1,150	115	...	...	24,702	1,848	2,373	75,339	5,721	157,419	10,495	39,454	2,802	34,178	2,278	...
Cacao	Cwts.	...	...	...	...	37	81	151	150	706	136	253	139	599	352	658	...
Chillies	"	27	93	29	55	3	4	9	306	1,092	531	1,040	...	...	...	...	...
Ground Nuts	"	33	45	58	70	...	...	...	22	40	277	339	...	...	...	...	...
Cotton Seed	"	...	...	...	...	...	...	...	9,185	2,252	52,202	12,601	...	...	...	...	...
Castor Oil Seed	"	...	...	...	...	...	...	...	237	266	8,518	1,443	...	...	...	...	...
Simsim Seed	"	...	...	...	...	...	...	...	1,652	2,338	2,083	2,643	...	...	...	...	...
" Oil	"	...	...	37	48	...	49	228	...	...	16	76	...	...	...	...	...
Cotton Seed Oil	"	...	...	...	...	...	...	...	161	900	335	876	...	...	...	...	...
Ghee (Clarified Butter)	"	143	959	1,276	6,052	...	1	7	380	2,336	1,482	7,148	...	...	...	...	...
Jaggree (Unrefined Sugar)	"	...	...	...	...	377	1	1	278	468	60	68	...	...	...	...	...
Hides and Calf Skins	"	4,229	29,638	12,546	59,152	224	1	258	2,524	16,288	21,130	97,675	...	...	...	...	...
Skins, Goat	"	56	703	113	896	3	54	...	914	15,444	1,763	12,044	...	...	...	...	...
" Sheep	"	2	11	...	...	...	...	...	13	69	73	272	...	...	...	...	...
" Miscellaneous	Value	...	...	...	...	...	...	...	...	13	...	7	...	...	...	...	...
Hippo Teeth	Lbs.	132	16	...	...	...	...	...	4,143	518	2,037	169	...	...	...	...	...
Horns	"	...	...	...	...	...	...	...	...	90	106	...	...	...	...	...	...
Ivory	"	166	133	...	...	55	1,993	917	64,360	41,788	114,436	46,462	...	...	...	...	...
Timber	Cwts.	...	...	235	157	71	749	495	68	69	156	104	...	...	...	...	...
Miscellaneous Produce	Value	...	298	...	614	...	...	184	...	1,134	...	1,693	...	...	...	...	...
Goods, Manufactured, unenumerated	"	...	158	...	165	77	...	42	...	227	...	242	...	...	...	...	...
Goods, Unmanufactured, "	"	...	20	...	5	14	...	2	...	196	...	18	...	...	...	...	...
Animals, Living	No.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Beeswax	Cwts.	40	257	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Buni Coffee	"	...	...	...	...	...	...	...	1,219	2,106	...	...	...	...	...	...	...
Tobacco	Lbs.	...	...	...	...	...	...	...	150	4	...	...	...	...	...	...	...
TOTALS	...	...	32,634	...	68,713	3,105	...	6,132	...	877,451	...	653,096	...	33,535	...	46,679	...

*lbs. Note:—Values for the nine months ended 31st December, 1920, are calculated at Fls. 10/- to the £ 1. Up to the 30th September, 1920, the value of cotton was at rates quoted from England but from the 1st October, it has been computed at prices ruling in the Protectorate.

COMPARATIVE STATEMENT OF EXPORTS—THE PRODUCE OF THE UGANDA PROTECTORATE—SHEWING QUANTITIES AND VALUES
FROM THE VARIOUS PORTS AND STATIONS, FOR THE YEARS ENDED 31ST MARCH, 1920 AND 9 MONTHS ENDED
31ST DECEMBER, 1920.—continued.

ARTICLES.	Unit.	JINJA.			MJANJIL.			OTHER PORTS AND STATIONS.			TOTALS.						
		Year—9 months ended 31-12-20.		Year ended 31-3-20.	Year 9 months ended 31 12 20		Year ended 31-3-20.	Year —9 months ended 31-12-20.		Year ended 31-3-20.	Year 9 months ended 31-12-20.		Year ended 31-3-20.				
		Quantity.	£		Quantity.	£		Quantity.	£		Quantity.	£					
Cotton, Ginned	Cwts.	83,114	1,838,078	54,865	507,532	19,338	377,166	11,213	110,727	35,650	822,130	24,510	216,283	170,338	3,773,931	130,464	1,209,663
Coffee, Husked	"	1,064	3,990	4,296	12,615	45	185	62	195	1,953	7,572	6,177	17,939	21,339	81,354	54,694	156,668
" Parchment	"	1,299	2,711	1,733	2,024	44	117	308	365	47	82	60	66	2,373	5,617	4,266	5,046
Rubber, Wild	Lbs.	...	...	234	10	...	...	...	...	...	...	...	...	1,890	154	2,089	...
" Plantation	"	159,760	12,273	157,350	10,490	...	...	...	...	12,254	844	3,988	216	312,659	23,603	388,523	25,902
Cacao	Cwts.	472	2,609	91	169	...	...	...	...	...	...	...	...	798	4,117	660	1,231
Chillies	"	2,294	8,384	4,558	9,088	202	778	6	12	80*	2	25	47	2,832	10,361	5,153	10,251
Ground Nuts	"	76	130	734	900	...	...	66	79	...	...	...	...	131	315	1,135	1,388
Cotton Seed	"	24,333	5,785	33,425	8,282	...	...	164	42	3,959	953	17,966	4,434	37,477	8,990	105,457	25,783
Castor Oil Seed	"	...	...	...	...	...	...	...	...	...	...	...	...	237	266	8,518	1,443
Simsim Seed	"	16,203	29,050	18,446	24,159	565	963	702	920	10,091	17,782	2,116	2,927	28,511	50,133	23,384	30,697
" Oil	"	3	19	37	166	...	...	...	...	...	...	...	...	3	19	102	470
Cotton Seed Oil	"	...	...	...	...	...	...	...	...	...	...	...	...	161	900	335	876
Ghee (Clarified Butter)	"	38	253	227	1,092	237	1,601	174	832	2	15	36	172	800	5,164	3,196	15,303
Jaggree (Unrefined Sugar)	"	132	221	371	451	...	...	...	...	...	...	...	...	634	1,066	432	520
Hides and Calf Skins	"	2,543	15,943	13,542	62,369	799	5,474	4,771	22,186	32	194	128	508	10,130	67,554	52,171	242,238
Skins, Goat	"	583	7,672	1,732	11,078	75	881	397	2,533	19	212	195	1,319	1,647	24,912	4,200	27,870
" Sheep	"	71	381	21	83	45*	2	1	5	...	...	...	...	86	463	95	360
" Miscellaneous	Value	...	...	...	2	...	4	...	...	...	62	...	...	...	79	...	9
Hippo Teeth	Lbs.	760	95	3,935	328	300	38	6,723	560	560	68	196	17	5,895	735	12,891	1,074
Horns	"	147	169	...	...	...	...	...	...	860	964	327	250	1,097	1,239	327	250
Ivory	"	7,263	4,447	4,036	1,614	519	324	19	11	22,914	14,705	40,607	16,948	95,332	61,452	161,091	65,952
Timber	Cwts.	135	225	835	555	2	2	...	...	...	...	...	...	276	373	1,975	1,311
Miscellaneous Produce	Value	...	322	...	794	...	93	...	106	...	...	...	...	...	1,907	...	3,395
Goods, Manufactured, unenumerated	"	...	2	...	16	...	2	...	...	...	...	...	229	...	547	...	694
Goods, Unmanufactured, unenumerated	"	...	28	...	25	...	...	...	...	...	61	...	...	...	319	...	50
Animals, Living	No.	...	...	...	3	...	...	...	...	...	...	...	...	...	...	3	3
Bees wax	Cwts.	...	...	3	...	...	...	...	...	...	...	...	...	40	257	...	...
Buni Coffee	"	559	1,002	...	...	22	40	...	...	119	213	...	...	1,919	3,361	...	...
Tobacco	Lbs.	...	...	...	...	156	4	...	...	...	...	...	...	306	8	...	...
TOTALS	...	...	1,933,789	...	653,845	...	387,674	...	138,573	...	865,948	...	261,499	...	4,134,136	...	1,828,537

*lbs

NOTE :—Values for the nine months ended 31st December, 1920, are calculated at Fls. 10/- to the £ 1.
Up to the 30th September, 1920, the value of cotton was at rates quoted from England, but from the 1st October, it has been computed at prices ruling in the Protectorate.

Details of Exports from other Ports and Stations are as follows:—

ARTICLES.	Unit.	MBULAMUTI		NAMASAGALI		MASINDI PORT		ATURA		PALANGA		KELLE		LALLI		BUGONDO		SAMBWE		KACHANG		NABIESO PORT		TOTALS	
		Quantity	£	Quantity	£	Quantity	£	Quantity	£	Quantity	£	Quantity	£	Quantity	£	Quantity	£	Quantity	£	Quantity	£	Quantity	£	Quantity	£
Cotton, Ginned	Cwts.	12,771	311,028	50*	4	...	...	...	...	...	...	...	...	11 672	243,158	8,674	215,700	2,533	52,242	...	...	...	...	35,650	852,180
Coffee, Husked	"	...	...	...	...	1,953	7,572	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,953	7,572
" Parchment	"	...	...	...	...	47	82	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47	82
" Buni	"	...	...	...	...	119	213	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	119	213
Rubber, Plantation	lbs.	...	...	...	...	5,000	900	7,254	544	...	...	...	...	...	...	...	...	...	...	...	...	...	...	12,254	844
Chillies	Cwts.	80*	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	80*	2
Cotton Seed	"	3,420	832	3	1	...	...	...	...	...	...	...	...	536	120	...	...	...	...	...	...	...	...	3,959	953
Simsim	"	...	...	...	...	...	...	6,422	11,626	101	101	843	1,373	200	403	...	...	...	...	2,312	3,969	213	310	10,091	17,782
Ghee	"	40	2	50*	3	80*	4	...	...	...	...	...	...	90*	6	...	...	...	...	...	...	...	...	2	15
Hides and Calf Skins	"	1	6	...	...	26	159	...	...	...	...	...	...	...	...	...	...	5	29	...	...	...	...	32	194
Skins, Goat	"	14	159	...	...	...	...	...	...	...	...	...	53	...	...	...	...	...	...	...	...	...	...	19	212
" Miscellaneous	Value	...	...	...	...	...	62	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	62
Ground Nuts	Cwts.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ivory	lbs.	...	...	...	...	22,784	14,627	...	...	...	...	180	78	...	...	...	...	...	...	...	...	...	...	22,914	14,705
Horns	"	...	...	...	...	860	964	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	860	964
Hippo Teeth	"	...	...	...	...	560	68	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	560	68
Miscellaneous Produce	Value	...	...	...	7	...	...	...	...	...	...	...	...	...	...	...	(6)†	...	...	...	...	...	...	...	8
Goods, Manufactured, unenumerated	"	...	...	...	...	...	40	...	...	...	...	...	35	...	...	...	6	...	...	...	...	...	...	...	81
Goods, Unmanufactured, unenumerated	"	...	...	...	26	...	(4)†	...	...	...	...	...	...	...	35	...	...	...	...	...	...	...	...	...	61
TOTALS...		...	312,027	...	41	24,091	...	12,170	...	101	...	1,539	...	...	243,723	...	215,706	...	52,271	...	3,969	...	310	...	865,918

* lbs.

† shillings.

ENTEBBE METEOROLOGICAL STATEMENT FOR THE YEAR 1920.

Lat. 0° 4' 31" N. Long. 32° 28' 30" E. Height of Barometer above M. S. L. 3842 feet.

MONTH.	AT 7 A.M.				AT 2 P.M.				AT 9 P.M.				Sunshine.	Rainfall.	No. of days Rain fell.
	Barometer corrected and reduced to 32° F.	Attached Thermometer.	Dry Bulb.	Wet Bulb.	Barometer corrected and reduced to 32° F.	Attached Thermometer.	Dry Bulb.	Wet Bulb.	Barometer corrected and reduced to 32° F.	Attached Thermometer.	Dry Bulb.	Wet Bulb.	Maximum Temperature.	Minimum Temperature.	
1920.															
JANUARY	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
FEBRUARY	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
MARCH	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
APRIL	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
MAY	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
JUNE	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
JULY	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
AUGUST	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
SEPTEMBER	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
OCTOBER	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
NOVEMBER	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
DECEMBER	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
MEAN FOR YEAR	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

**Statement of Extra Meteorological Observations taken
at Entebbe, for 1920.**

MONTH.				Solar Radiation Thermometer.		Terrestrial Radiation Minimum Thermometer.
				Black,	Bright,	
				2 P.M.		
JANUARY	...	...	...	127·8 (*)	102·9	58·4
FEBRUARY	...	...	...	No records	102·5	56·6
MARCH	...	...	...		99·0	53·5
APRIL	...	...	...		101·4	56·4
MAY	...	...	...		96·6	54·5
JUNE	...	...	...		99·9	52·4
JULY	...	...	...		98·9	47·3
AUGUST	...	...	...		100·1	50·5
SEPTEMBER	...	...	...	125·5 (+)	100·3	48·1
OCTOBER	...	...	...	143·4	102·7	50·5
NOVEMBER	...	...	...	137·8	99·9	49·8
DECEMBER	...	...	...	137·0	98·4	50·1
MEAN FOR YEAR				134·3	100·4	52·3

(*) Records for 19 days.

(+) Records for 3 days.

**Statement of Extra Meteorological Observations taken
at Entebbe.**

MONTH.				Earth Thermometer 1½ feet.			Earth Thermometer 4 feet.		
				7 A.M.	2 P.M.	9 P.M.	7 A.M.	2 P.M.	9 P.M.
				0	0	0	0	0	0
JANUARY	...	...	...	76·6	76·7	76·7	76·0	76·1	76·2
FEBRUARY	...	...	...	78·3	78·5	78·3	76·5	76·6	76·7
MARCH	...	...	...	76·8	76·9	77·1	76·8	76·9	76·7
APRIL	...	...	...	76·2	76·3	76·3	76·5	76·5	76·5
MAY	...	...	...	74·8	75·0	74·9	76·0	76·1	76·0
JUNE	...	...	...	74·6	74·6	74·7	75·3	75·2	75·2
JULY	...	...	...	74·1	74·2	74·2	75·1	75·2	75·1
AUGUST	...	...	...	74·5	74·7	74·7	75·1	75·1	75·0
SEPTEMBER	...	...	...	76·4	76·6	76·5	75·7	75·7	75·6
OCTOBER	...	...	...	76·9	77·2	77·0	76·5	76·5	76·3
NOVEMBER	...	...	...	77·6	77·7	77·7	77·1	77·2	77·1
DECEMBER	...	...	...	75·8	76·0	75·9	76·3	76·4	76·2
MEAN FOR YEAR				76·1	76·2	76·2	76·1	76·1	76·1

**Statement Showing Average Hourly Velocity of Wind
for 1920 between the Hours of:—**

MONTH.				9 P.M. TO 7 A.M.	7 A.M. TO 2 P.M.	2 P.M. TO 9 P.M.
JANUARY	...	...	...	2·5	3·9	3·3
FEBRUARY	...	...	...	2·9	5·0	4·0
MARCH	...	...	...	2·8	3·9	3·5
APRIL	...	...	...	2·6	4·3	3·2
MAY	...	...	...	2·2	3·6	3·1
JUNE	...	...	...	3·0	3·5	3·4
JULY	...	...	...	2·5	3·7	2·5
AUGUST	...	...	...	2·0	4·1	2·8
SEPTEMBER	...	...	...	2·7	4·7	3·1
OCTOBER	...	...	...	2·5	4·9	3·4
NOVEMBER	...	...	...	2·5	4·2	3·3
DECEMBER	...	...	...	2·5	3·9	2·7
MEAN FOR YEAR				2·6	4·1	3·2

MASAKA Meteorological Statement for the Year 1920.

Lat. 0° 21' S.

Long. 31° 47' E.

Height above M.S.L. 4150—4250 feet.

	7 A.M.		2 P.M.		9 P.M.					
MONTH.	Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.	Maximum Temperature.	Minimum Temperature.	Rain.	No. of days rain fell.
	o	o	o	o	o	o	o	o	In.	
JANUARY ...	63·8	61·5	77·5	69·8	67·5	64·2	79·2	61·6	1·58	7
FEBRUARY ...	65·1	63·4	80·4	75·1	68·8	66·9	83·2	62·8	·56	6
MARCH ...	64·3	63·9	76·0	74·5	72·6	65·9	78·3	62·8	6·35	20
APRIL ...	64·4*	63·5*	73·4*	70·9*	66·6*	64·8*	75·1*	62·3*	7·57	17
MAY ...	64·5	62·8	73·2	67·5	66·9	62·9	72·2	64·7	10·89	20
JUNE ...	64·7	62·0	74·2	63·5	65·5	63·7	74·7	61·4	·30	5
JULY ...	63·3	60·0	73·4	65·9	65·6	62·9	76·5	60·6	·09	2
AUGUST ...	64·5	61·6	74·4	66·0	65·2	63·3	77·9	60·4	·78	6
SEPTEMBER ...	64·4	62·2	76·2	60·3	65·6	63·4	79·8	66·7	1·99	9
OCTOBER ...	64·6	62·7	75·6†	67·4†	65·2†	63·1†	78·6†	61·3†	5·80	11
NOVEMBER ...	64·9	62·9	72·9†	67·8	65·7	63·6	77·7	61·3	4·96	14
DECEMBER ...	63·4	61·9	75·4	67·2	66·2	63·9	77·5	61·5	4·55	11
MEAN FOR YEAR	64·3	62·4	75·2	68·0	66·8	64·0	77·6	62·3	TOTAL 45·42	128

(*) Records for 22 days.

(†) Records for 30 days.

(‡) Records for 29 days.

JINJA Meteorological Statement for the Year 1920.

Lat. 0° 26' N.

Long. 33° 11' E.

Height above M.S.L. 3722 feet.

	7 A.M.		2 P.M.		9 P.M.					
MONTH.	Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.	Maximum Temperature.	Minimum Temperature.	Rain.	No. of days rain fell.
	o	o	o	o	o	o	o	o	In.	
JANUARY ...	67·5	65·9	80·7	69·6	71·1	67·3	80·3	65·8	1·53	4
FEBRUARY ...	66·7	64·7	72·1	68·9	69·6	66·1	85·5	64·6	·66	3.
MARCH ...	68·1	63·1	77·3	73·3	64·9	63·2	78·7	63·7	8·20	15
APRIL ...	65·2	63·3	79·8	70·4	64·9	63·1	82·4	63·8	4·90	13
MAY ...	67·9	65·4	81·6	70·4	67·8	63·8	86·5	63·9	3·29	12
JUNE ...	66·5	64·9	80·5	70·3	66·9	64·7	85·2	62·6	2·93	8
JULY ...	65·1	64·2	74·2	70·8	66·0	64·4	86·2	62·3	1·85	5
AUGUST ...	66·6	64·3	79·4*	66·3*	66·1	64·9	86·9	62·7	3·30	3
SEPTEMBER ...	65·2	64·6	79·7	71·3	66·4	65·9	82·5	60·8	1·86	4
OCTOBER ...	65·5	64·8	79·9	70·6	66·0†	65·0†	83·7†	64·2†	2·19	8
NOVEMBER ...	65·1	64·6	78·8	69·6	65·9	65·2	83·1	61·0	3·50	12
DECEMBER ...	65·0	64·4	83·5	70·6	65·8	64·7	83·6	60·6	3·80	8
MEAN FOR YEAR	66·2	64·5	78·9	70·2	66·8	64·9	83·7	63·0	TOTAL 38·01	95

(*) Records for 29 days.

(†) Records for 30 days.

MBARARA Meteorological Statement for the Year 1920.

Lat. 0° 31' S.

Long. 30° 47' E.

Height above M.S.L. 4500 feet.

	7 A.M.		2 P.M.		9 P.M.					
MONTH.	Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.	Maximum Temperature.	Minimum Temperature.	Rain.	No. of days rain fell.
	o	o	o	o	o	o	o	o	In.	
JANUARY ...	65·8	63·5	80·0	70·5			81·5	...	1·41	2
FEBRUARY ...	68·7	65·8	83·1	71·8			81·8	...	·98	3
MARCH ...	67·5	65·1	77·5	71·0			80·4	...	4·27	16
APRIL ...	67·7	65·5	74·3	69·2			79·3	...	5·52	13
MAY ...	69·4	63·7	76·3	66·7			78·8	56·7*	1·69	4
JUNE ...	72·5	63·8	79·0	63·9			80·6	56·6	·52	2
JULY ...	70·7	61·5	80·1	64·6			82·7	54·0	·86	3
AUGUST ...	68·9	64·1	77·4	69·4			82·3	51·6	·84	4
SEPTEMBER ...	69·3	64·8	79·9	70·3			82·1	52·8	2·59	8
OCTOBER ...	67·9	65·5	76·7	71·0			79·3	53·3	8·15	13
NOVEMBER ...	66·0	64·2	74·4	69·2			74·6	51·3	4·51	12
DECEMBER ...	66·5	65·2	77·2	71·2			78·1	50·6	4·19	8
MEAN FOR YEAR	68·4	64·4	77·9	69·1			80·1	53·4	35·53	88

(*) Records for 4 days.

FORT PORTAL Meteorological Statement for the Year 1920.

Lat. 0° 43' N. Long. 30° 8' E. Height above M.S.L. 5299 feet.

			7 A.M.		2 P.M.		Maximum Tempera- ture.	Minimum Tempera- ture.	Rain.	No. of days rain fell.
MONTH.			Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.				
			o	o	o	o	o	o	In.	
JANUARY	...	...	62·4	59·5	76·1	63·9	79·9	53·2	·49	1
FEBRUARY	...	...	66·3	62·8	79·4	65·7	81·6	56·6	·14	1
MARCH	...	...	64·9	62·6	72·7	66·2	78·3	58·0	6·13	17
APRIL	...	...	63·2	60·4	71·9	65·1	77·3	56·4	7·54	12
MAY	...	...	63·8	61·3	71·3	65·0	78·0	55·4	2·10	11
JUNE	...	...	63·5	60·6	73·4	65·2	75·4	56·0	4·64	8
JULY	...	...	62·3	57·8	73·2	62·8	76·2	55·2	2·38	10
AUGUST	...	...	61·1	59·2	72·5	62·8	76·1	54·6	4·32	11
SEPTEMBER	...	...	61·9	57·0	67·9	60·8	74·9	55·8	6·05	14
OCTOBER	...	...	62·6	60·0	70·4	64·6	77·5	56·2	5·20	10
NOVEMBER	...	...	62·9	56·9	68·0	63·8	72·7	56·0	10·57	21
DECEMBER	...	...	63·8	60·6	72·8	66·1	79·1	54·1	1·12	6
MEAN FOR YEAR			63·2	59·9	72·5	64·3	77·2	55·6	TOTAL 50·68	122

GULU Meteorological Statement for the Year 1920.

Lat. 2° 45' N. Long. 32° 25' E.

			7 A.M.		2 P.M.		Maximum Tempera- ture.	Minimum Tempera- ture.	Rain.	No. of days rain fell.
MONTH.			Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.				
			o	o	o	o	o	o	In.	
JANUARY	...	...	71·3	62·4	85·5	73·9	86·9	63·9	Nil	...
FEBRUARY	...	...	74·0	61·1	88·0	67·2	88·9	67·6	·68	1
MARCH	...	...	71·0	63·8	83·0	69·1	84·5	72·8	1·86	8
APRIL	...	...	70·8	66·1	83·3	71·6	84·6	72·1	10·89	19
MAY	...	...	71·0	65·2	81·7	70·8	82·6	70·8	10·69	19
JUNE	...	...	70·4	64·8	82·3	72·3	82·7	71·9	5·41	14
JULY	...	...	71·6	66·2	80·9	71·3	82·0	63·6	6·95	17
AUGUST	...	...	70·5	64·3	81·6	71·9	82·1	63·3	6·35	11
SEPTEMBER	...	...	71·5	64·1	81·9	71·2	82·5	63·1	1·74	5
OCTOBER	...	...	68·6	64·6	80·8	70·2	82·5	60·6	4·46	14
NOVEMBER	...	...	69·1	65·6	81·9	69·7	83·5	60·4	6·18	13
DECEMBER	...	...	69·3	65·1	83·2	69·3	83·7	60·1	1·54	5
MEAN FOR YEAR			70·8	64·4	82·8	70·7	83·9	65·9	TOTAL 56·75	126

KAMPALA Meteorological Statement for the Year 1920.

Lat. 0° 19' N. Long. 32° 35' E. Height above M.S.L. 3905 feet.

			7 A.M.		2 P.M.		Maximum Tempera- ture.	Minimum Tempera- ture.	Rain.	No. of days rain fell.
MONTH.			Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.				
			o	o	o	o	o	o	In.	
JANUARY	...	...	65·4	63·2	82·5	72·4	86·2	63·3	3·33	6
FEBRUARY	...	...	66·7	64·0	85·2	72·6	86·4	62·2	·65	6
MARCH	...	...	67·7	65·0	73·9	67·7	81·2	64·5	4·38	15
APRIL	...	...	66·4	64·6	77·3	70·6	79·2	61·9	4·74	17
MAY	...	...	65·7	64·2	77·1	72·0	78·2	62·3	5·48	21
JUNE	...	...	64·7	63·6	76·2	69·0	77·8	61·9	3·24	14
JULY	...	...	64·1	62·8	74·8	71·8	76·1	61·5	4·69	15
AUGUST	...	...	62·9	61·6	77·0	73·3	78·3	60·7	2·92	10
SEPTEMBER	...	...	63·5	62·3	78·4	73·4	81·0	61·2	4·45	11
OCTOBER	...	...	64·9	63·8	79·7	75·0	82·4	61·9	3·50	18
NOVEMBER	...	...	65·3	64·2	79·8	74·7	81·8	61·9	5·58	20
DECEMBER	...	...	65·5	64·5	80·6	74·9	83·2	62·5	3·39	15
MEAN FOR YEAR			65·2	63·6	78·5	72·3	81·0	62·1	TOTAL 46·35	168

MUBENDI Meteorological Statement for the Year 1920.

Lat. 0° 30' 26" N.

Long. 31° 22' 22" E.

Height above M.S.L. 5121 feet.

	7 A.M.		2 P.M.		9 P.M.					
MONTH.	Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.	Maximum Temperature.	Minimum Temperature.	Rain.	No. of days rain fell.
	o	o	o	o	o	o	o	o	In.	
JANUARY ...	68·9	64·1	75·9	64·5	72·8	66·1	81·0	67·8	·37	2
FEBRUARY ...	70·6	63·3	78·2	68·7	73·6	67·4	82·5	68·2	1·45	4
MARCH ...	66·9	63·2	73·1	67·9	70·3	65·5	77·9	65·1	3·61	11
APRIL ...	64·6	62·3	70·4	65·6	67·5	64·3	76·6	63·2	4·30	10
MAY ...	63·4	61·9	71·3	66·6	66·3	63·5	77·8	62·9	3·19	14
JUNE ...	64·5	62·2	72·4	67·6	65·5	63·4	76·6	62·5	4·41	10
JULY ...	65·1	61·8	72·0	66·1	65·3	62·2	72·2	62·9	·60	4
AUGUST ...	65·6	62·2	71·7	65·4	65·7	63·1	72·3	63·4	5·36	14
SEPTEMBER	67·0	64·2	73·3	67·4	68·4	65·2	73·7	64·2	5·65	12
OCTOBER ...	66·5	64·2	73·3	68·5	68·1	65·5	73·5	64·4	6·61	19
NOVEMBER...	65·6	61·9	69·9	64·5	67·8	63·3	72·0	63·9	7·05	19
DECEMBER...	64·7	61·9	71·4	65·6	66·9	62·6	72·2	62·9	1·93	9
MEAN FOR YEAR	66·1	62·8	72·7	66·5	68·2	64·3	75·7	64·3	TOTAL 44·53	128

MASINDI Meteorological Statement for the Year 1920.

Lat. 1° 40' N.

Long. 31° 50' E.

Height above M.S.L. 3764 feet.

MONTH.	Maximum Temperature.	Minimum Temperature.	Rain.	No. of days rain fell.
	o	o	In.	
JANUARY ...	83·7	61·4	Nil	Nil
FEBRUARY ...	89·3	63·8	1·00	4
MARCH ...	86·2	63·7	4·02	11
APRIL ...	86·4	63·6	8·31	15
MAY ...	85·8	62·4	8·22	15
JUNE ...	84·2	61·4	5·12	10
JULY ...	84·1	59·5	3·43	10
AUGUST ...	82·9	59·1	4·87	12
SEPTEMBER	84·0	59·5	2·48	10
OCTOBER ...	83·4	61·2	7·76	12
NOVEMBER ...	82·3	61·0	8·96	15
DECEMBER ...	83·5	60·1	·61	3
MEAN FOR YEAR ...	84·6	61·4	TOTAL 54·78	117

SERERE Meteorological Statement for the Year 1920.

Lat. 1° 31' N. Long. 33° 27' E. Height above M.S.L. 3600 feet.

MONTH.	Maximum Temperature.	Minimum Temperature.	Rain.	Number of days rain fell.
	o	o	In.	
JANUARY...	Readings not taken	Readings not taken	Readings not taken	Readings not taken
FEBRUARY	Readings not taken	Readings not taken	Readings not taken	Readings not taken
MARCH ...	Readings not taken	Readings not taken	Readings not taken	Readings not taken
APRIL ...	Readings not taken	Readings not taken	Readings not taken	Readings not taken
MAY ...	Readings not taken	Readings not taken	Readings not taken	Readings not taken
JUNE ...	Readings not taken	Readings not taken	Readings not taken	Readings not taken
JULY ...	86·2	63·7	3·93	12
AUGUST ...	86·8	64·9	6·57	16
SEPT. ...	87·2	64·6	6·39	12
OCTOBER...	86·4	64·0	2·68	12
NOVEMBER	86·6	65·5	3·07	15
DECEMBER	89·0	65·3	·64	5
MEANS ...	87·0	64·7	23·28	72

BUKALASA Meteorological Statement for the Year 1920.

Lat. 0° 43' N. Long. 32° 30' E. Height above M.S.L. 3700 feet.

MONTH.	Maximum Temperature.	Minimum Temperature.	Rain.	Number of days rain fell.
	o	o	In.	
JANUARY	Readings not taken	Readings not taken	Readings not taken	Readings not taken
FEBRUARY	Readings not taken	Readings not taken	Readings not taken	Readings not taken
MARCH ...	Readings not taken	Readings not taken	Readings not taken	Readings not taken
APRIL ...	Readings not taken	Readings not taken	Readings not taken	Readings not taken
MAY ...	Readings not taken	Readings not taken	Readings not taken	Readings not taken
JUNE ...	Readings not taken	Readings not taken	Readings not taken	Readings not taken
JULY ...	82·0	54·5	4·25	8
AUGUST ...	83·9	58·2	3·64	14
SEPT. ...	84·2	58·7	3·84	12
OCTOBER...	86·0	60·0	4·17	13
NOVEMBER	84·5	61·6	3·73	13
DECEMBER	86·0	60·1	3·50	7
MEANS ...	84·4	58·8	23·13	67

Comparative Rainfall Statement, showing the Monthly Rainfall for the Year 1920, of Forty-nine Localities of the Uganda Protectorate.

MONTH.	Entebbe.		Jinja.		Mbarara.		Masaka.		Fort Portal.		Butiaba.		Masindi.		Gulu.		Kampala.		Mbale.		Mubendi.		Budo.		Buk on a.	
	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days
JANUARY	2.42	7	1.53	4	1.41	2	1.58	7	0.49	1	Nil	Nil	Nil	Nil	Nil	0.68	3.33	6	0.43	2	0.97	2	0.91	3	1.06	5
FEBRUARY	1.36	2	.66	3	.98	3	0.56	6	0.14	1	0.56	2	1.00	4	0.68	1	0.65	6	0.36	3	1.45	4	1.13	3	1.81	1
MARCH	4.12	14	8.20	15	4.27	16	6.35	20	6.13	17	1.59	7	8.02	11	1.86	8	4.38	15	8.86	19	3.61	11	3.76	10	5.19	10
APRIL	1.46	14	4.90	13	5.52	13	7.37	17	7.54	12	5.03	14	8.31	15	10.89	19	4.74	17	7.23	20	4.80	10	5.69	15	11.75	14
MAY	14.28	21	3.29	12	1.69	4	10.89	20	2.10	11	2.65	9	8.92	15	10.69	19	5.48	21	7.76	24	3.19	14	7.50	19	4.76	15
JUNE	8.07	10	2.93	8	0.52	2	0.30	5	4.84	8	5.03	8	5.12	10	5.41	14	3.94	14	3.71	15	4.41	10	1.86	12	4.13	12
JULY	3.32	7	1.85	5	.86	3	0.09	2	2.38	10	1.56	4	3.43	10	6.95	17	4.69	15	3.44	13	0.60	4	3.28	7	2.28	9
AUGUST	1.52	7	3.30	3	.84	4	0.73	6	4.32	11	4.90	10	4.87	12	6.35	11	2.92	10	3.97	16	5.36	14	2.81	6	4.22	9
SEPTEMBER	1.65	5	1.86	4	2.59	8	1.99	9	6.05	14	2.38	6	2.48	10	1.74	5	4.45	11	8.46	13	5.65	12	2.06	5	4.34	10
OCTOBER	1.54	9	2.19	8	8.15	13	5.80	11	5.20	10	4.99	12	7.76	15	4.46	14	3.50	18	5.51	19	6.61	19	4.67	11	8.15	15
NOVEMBER	3.56	15	3.50	12	4.51	12	4.96	14	10.57	21	No readings taken	12	8.96	15	6.18	13	5.58	20	2.70	17	7.05	19	7.04	11	6.23	13
DECEMBER	5.75	14	3.80	8	4.19	8	4.55	11	1.12	6	Nil	3	0.61	3	1.54	5	3.39	15	1.12	6	1.93	9	3.35	11	1.26	2
TOTAL	55.05	125	38.01	95	35.53	88	45.42	128	50.68	122	28.69	72	54.78	117	56.75	126	46.35	168	53.55	148	44.53	128	44.06	113	55.18	115

MONTH.	Naminage.		Lira.		Soroti.		Hoima.		Namukeyera.		Butiti.		Bukumi.		Rubaga.		Ngora.		Kisubi.		Kivuvu.		Magigye.		Nandere.	
	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days
JANUARY	0.05	1	Nil	Nil	0.13	4	Records taken	3	1.93	3	0.58	2	2.43	3	3.80	8	No Record	1	1.70	Nil	1.53	3	1.96	4	0.81	4
FEBRUARY	Nil	Nil	0.14	2	0.33	3	Records taken	2	1.40	2	0.85	2	0.95	3	0.96	2	0.59	10	Nil	Nil	1.23	2	0.85	4	0.53	2
MARCH	5.50	...	4.59	14	6.04	14	Records taken	3	No records taken	3	4.13	12	3.04	11	6.86	13	6.20	10	6.00	7	6.93	15	4.14	16	4.82	11
APRIL	5.61	...	11.20	13	8.18	16	Records taken	10	No records taken	10	5.25	16	4.96	11	4.74	13	No	...	8.85	11	4.13	10	7.48	17	5.18	16
MAY	4.63	17	11.15	19	11.83	19	Records taken	9	5.00	9	2.73	11	5.55	7	6.75	9	Records taken	...	19.10	17	3.98	11	5.05	14	4.55	13
JUNE	4.65	11	6.82	11	2.67	10	Records taken	9	5.00	9	2.87	13	1.29	4	2.56	4	Records taken	...	7.74	6	3.44	12	1.51	5	1.99	4
JULY	1.71	8	4.29	8	4.36	8	Records taken	22	5.00	22	1.47	6	0.87	3	4.21	7	3.82	7	2.44	9	3.51	10	2.67	5	3.77	9
AUGUST	2.64	3	8.51	13	5.12	11	Records taken	22	5.00	22	4.89	15	6.82	11	3.57	7	2.53	7	6.66	9	2.49	7	2.33	11	...	...
SEPTEMBER	7.75	11	4.50	9	8.81	11	Records taken	20	5.00	20	5.56	13	4.31	10	3.28	4	No Record	...	3.86	5	2.78	14	4.37	11	...	...
OCTOBER	7.75	11	7.89	13	5.41	12	Records taken	24	5.00	24	6.51	20	5.46	13	4.00	8	2.63	9	5.16	8	4.76	16	6.27	11	...	...
NOVEMBER	No records taken	...	4.59	10	2.31	8	Records taken	18	5.00	18	6.38	19	6.11	9	5.14	13	2.56	6	5.16	9	3.89	12	9.41	22	...	...
DECEMBER	40.29	62	0.72	1	0.68	2	Records taken	5	2.53	6	1.41	10	Nil	10	4.20	5	0.59	1	8.07	10	6.35	5	2.92	7	...	...
TOTAL	40.29	62	64.40	113	55.87	118	37.50	98	10.86	21	42.63	139	41.82	85	50.07	90	18.92	41	71.83	94	45.02	117	48.96	127	21.65	59

COMPARATIVE RAINFALL STATEMENT, SHOWING THE MONTHLY RAINFALL FOR THE YEAR 1920,
OF FIFTY-NINE LOCALITIES OF THE UGANDA PROTECTORATE—continued.

MONTH.	Moniko.		Bombo.		Bwavy.		Kakumiro.		Bunyara-guru.		Katigondo.		Masindi Port.		Nambeya.		Kitgum.		Kilclooney.		Namasagali.		Hoima River Estate.		Nyondo.	
	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days
JANUARY	0'56	5	0'26	3	2'97	13	0'55	1	0'47	1	0'91	7	0'40	2	1'99	4	0'09	1	1'56	4	0'15	1	1'20	2	1'84	2
FEBRUARY	1'68	4	0'99	4	2'16	5	1'08	3	1'74	4	0'06	2	0'06	2	1'03	4	0'21	2	2'47	5	0'11	1	0'38	4	0'92	4
MARCH	5'31	13	4'03	10	3'47	16	5'77	12	4'62	16	3'50	18	7'11	10	3'39	12	4'38	7	4'52	15	7'31	8	9'22	14	8'40	17
APRIL	9'43	13	6'64	20	8'01	18	4'76	13	9'27	19	7'15	12	6'53	10	4'43	16	5'60	8	10'61	22	7'82	18	9'19	20	7'35	14
MAY	6'73	15	3'91	20	5'13	16	3'02	8	4'11	11	9'49	11	6'43	14	7'00	26	8'89	19	3'97	9	7'30	15	4'11	13	9'17	20
JUNE	1'57	6	1'37	8	3'97	15	3'95	8	3'20	6	0'19	2	1'96	7	7'00	26	7'00	16	4'44	8	1'96	4	4'50	14	5'26	12
JULY	2'45	6	5'66	6	1'38	8	1'57	6	0'93	6	1'77	7	1'00	5	No Records taken	No Records taken	5'29	10	1'89	4	1'09	4	5'19	14	2'74	8
AUGUST	1'67	8	2'91	7	1'08	4	2'48	7	2'65	8	0'98	4	2'64	8	No Records taken	No Records taken	11'85	9	6'01	12	3'92	8	3'71	16	4'35	13
SEPTEMBER	1'28	5	3'62	10	3'46	9	6'92	14	8'79	16	0'90	5	3'86	11	No Records taken	No Records taken	6'90	14	8'83	17	2'71	11	6'44	18	3'58	16
OCTOBER	No Record		4'33	14	2'95	16	5'27	19	11'40	27	2'91	10	3'76	12	No Records taken	No Records taken	3'15	4		No	3'12	11	10'06	20	4'59	15
NOVEMBER	4'36	11	6'74	15	6'84	18	3'76	18	4'72	18	3'10	12	4'83	16	No Records taken	No Records taken	3'62	9	Records taken	No	3'13	10	7'08	19	3'22	19
DECEMBER	No Record		3'52	5	4'79	8	0'59	5	2'33	9	5'14	10	2'62	11	No Records taken	No Records taken	0'16	1		taken	3'59	7	2'10	8	3'30	5
TOTAL	35'04	86	43'98	122	46'21	146	39'72	114	54'23	141	35'33	93	41'20	108	17'84	62	57'14	100	44'30	96	42'21	98	63'13	162	54'72	145

MONTH.	Mutai.		Nsambya.		Bugondo.		Lale.		Sisa.		Ndibulungi.		Kabale.		Buye Estate.		Bukalasa.		Serere.	
	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days	In.	No. of days
JANUARY	Nil	Nil	1'07	4	Nil	Nil	0'12	1	3'02	3	0'45	2	2'72	5	0'75	9	No Readings taken	No Readings taken	No Readings taken	No Readings taken
FEBRUARY	0'95	1	0'72	3	Nil	Nil	0'20	2	1'27	2	1'63	7	1'54	5	3'03	4	No Readings taken	No Readings taken	No Readings taken	No Readings taken
MARCH	7'15	5	4'31	12	6'42	6	3'83	10	2'57	8	0'98	7	7'28	13	3'27	13	No Readings taken	No Readings taken	No Readings taken	No Readings taken
APRIL	5'58	6	6'05	18	7'19	10	9'29	17	12'26	20	0'91	5	2'11	6	4'47	14	No Readings taken	No Readings taken	No Readings taken	No Readings taken
MAY	3'30	5	4'46	9	4'01	8	12'24	20	10'47	19	2'02	19	3'70	8	4'94	20	No Readings taken	No Readings taken	No Readings taken	No Readings taken
JUNE	4'35	4	4'08	6	4'38	7	2'88	11	2'02	4	0'08	1	0'55	1	1'01	7	No Readings taken	No Readings taken	No Readings taken	No Readings taken
JULY	1'01	2	4'05	7	1'08	4	2'04	10	1'72	4	0'08	2	0'08	2	0'62	7	No Readings taken	No Readings taken	No Readings taken	No Readings taken
AUGUST	3'00	4	2'30	8	3'89	6	4'44	12	3'57	6	0'35	3	0'35	3	1'65	9	No Readings taken	No Readings taken	No Readings taken	No Readings taken
SEPTEMBER	3'26	5	3'94	9	5'00	8	8'22	13	2'76	...	2'87	8	2'87	8	3'82	16	No Readings taken	No Readings taken	No Readings taken	No Readings taken
OCTOBER	6'75	10	5'44	15	4'80	5	5'12	12	7'12	...	6'83	15	6'83	15	4'24	16	No Readings taken	No Readings taken	No Readings taken	No Readings taken
NOVEMBER	7'05	8	5'31	17	1'45	7	2'81	13	No Records taken	8	No Records taken	15	5'03	15	9'65	22	No Readings taken	No Readings taken	No Readings taken	No Readings taken
DECEMBER	2'95	3	4'76	10	0'10	1	0'88	2	No Records taken	...	No Records taken	10	3'55	10	3'53	15	No Readings taken	No Readings taken	No Readings taken	No Readings taken
TOTAL	45'35	53	46'49	118	38'32	62	52'07	123	46'78	74	3'97	21	36'61	91	40'98	152	No Readings taken	No Readings taken	No Readings taken	No Readings taken

**Statement showing Situations and Latitudes, Longitudes and Heights
of the Meteorological Stations in the Uganda Protectorate.**

<i>Station.</i>	<i>Situation.</i>	<i>Latitude.</i>	<i>Longitude.</i>	<i>Height in feet above Mean Sea Level.</i>
Bombo	Buganda Kingdom	0°35' N.	32°32' E.	3967 (Approx.)
Budo	" "	0°16' N.	32°29' E.	4200—4300
Bugondo	Eastern Province	1°37' N.	33°17' E.	3500
Bukalasa	Buganda "	0°43' N.	32°30' E.	3700
Bukona	Eastern "	0°30' N.	33°37' E.	—
Bukumi	Buganda Kingdom	0°49' N.	31°22' E.	4200
Bunyaraguru	Western Province	0°14' S.	30°00' E.	3200
Butiaba	Northern "	1°50' N.	31°26' E.	2025
Butiti	Western "	0°39' N.	30°32' E.	—
Buye	Buganda Kingdom	0°12' N.	32°00' E.	4270
Bwavu	" "	0°21' N.	33° 1' E.	4200 (Approx.)
Entebbe	" "	0° 4' 31" N.	32°28' 30" E.	3842
Fort Portal	Western Province	0°43' N.	30° 8' E.	5299
Gulu	Northern "	2°45' N.	32°25' E.	—
Hoima	" "	1°30' N.	31°30' E.	3801
Hoima River Estate	" "	1°30' N.	31°21' E.	4000
Jinja	Eastern "	0°26' N.	33°11' E.	3722
Kabale	Western "	1°15' S.	29°59' 28" E.	—
Kakumiro	Buganda Kingdom	0°46' N.	31°18' E.	4511
Kampala	" "	0°19' N.	32°35' E.	3905
Katigondo	" "	0°13' S.	31°44' E.	4290
Kilclooney	Western Province	0°30' N.	30°20' E.	—
Kitgum	Eastern "	3°20' N.	32°55' E.	—
Kisubi	Buganda Kingdom	0°10' N.	32°33' E.	3850
Kivuvu	" "	0°23' N.	32°47' E.	3600—3700
Lale	Eastern Province	1°42' N.	33°28' E.	—
Lira	" "	2°15' N.	32°55' E.	—
Magigye	Buganda Kingdom	0°29' N.	32°36' E.	3900
Masaka	" "	0°21' S.	31°47' E.	4150—4250
Masindi	Northern Province	1°40' S.	31°50' E.	3764
Masindi Port	" "	1°42' N.	32°05' E.	3360
Moniko	Buganda Kingdom	0°23' N.	32°55' E.	4100
Mubendi	" "	0°30' 26" N.	31°22' 52" E.	5121
Mutai	Eastern Province	0°34' N.	33°14' E.	3600
Mbale	" "	1° 2' N.	43° 6' E.	—
Mbarara	Western "	0°31' S.	30°47' E.	4500
Namasagali	Eastern "	1°00' N.	32°57' E.	3400
Nambeya	Buganda Kingdom	0°38' N.	32°20' E.	4000
Namenage	Eastern Province	0°51' N.	33°10' E.	3600—3800
Namukekera	Buganda Kingdom	0°41' N.	32°14' E.	3700
Nandere	" "	0°38' N.	32°30' E.	3900 (Approx.)
Ndibulungi	" "	0°23' N.	32°05' 03" E.	4200
Ngora	Eastern Province	1°28' N.	33°48' E.	—
Nsambya	Buganda Kingdom	0°18' N.	32°34' E.	4020
Nyondo	Eastern Province	1°01' N.	34°14' E.	—
Rubaga	Buganda Kingdom	0°18' N.	32°33' E.	4135
Serere	Eastern Province	1°31' N.	32°27' E.	3600
Sisa	Buganda Kingdom	0°10' 28" N.	32°29' 54" E.	4100
Soroti	Eastern Province	1°43' N.	33°37' E.	3690

